

*Capital and Credit Needs  
in a Changing Agriculture*

Edited by

E. L. Baum

Howard G. Diesslin

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*Capital and Credit Needs  
in a Changing Agriculture*

# *Planning Committee*

**for the Symposium  
on Capital and Credit Needs  
in a Changing Agriculture**

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*Symposium on*

# *Capital and Credit Needs in a Changing Agriculture*

Edited by

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The Iowa State University Press, *Ames*, Iowa, U.S.A.

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Library of Congress Catalog Card Number: 61-11033

Lithoprinted in the United States of America

## Foreword

**A**GRICULTURE is being forced to undertake many major production adjustments. In order to keep up with technological developments and cost-price relationships, farmers must increase capital investments in farm equipment, machinery, and buildings and related equipment. In addition, they must meet increased annual operating expenses for fertilizers, new and improved seeds, insecticides, pesticides, and the like. Capital and credit problems have become important limiting factors in the adjustment process.

Because of larger farms and scale of operations, capital accumulation has been easier in some regions than in others. Adjustments in agriculture in the Tennessee Valley and the Southeast have been more difficult because farmers there lack ability to generate capital or obtain credit. The Southeast has the largest number of low-production and low-income farmers. Many farmers with small production units seek to avert risk by avoiding opportunities to obtain necessary capital for expanding their holdings, or for adopting improved practices necessary for more efficient operation.

The Tennessee Valley Authority, the Farm Foundation, and the Center for Agricultural and Economic Adjustment at Iowa State University sponsored a Symposium on "Capital and Credit Problems in a Changing Agriculture," with the aim of more clearly identifying these emerging problems and aiding in their solution. The U. S. Department of Agriculture actively assisted these sponsoring organizations.

All these organizations are keenly interested in the effect of capital and credit problems on the future development of our nation's agriculture. TVA is vitally concerned with the comprehensive development of the resources in the Tennessee Valley. The Farm Foundation sponsors research and extension educational activities through regional agricultural research and extension work groups and committees throughout the United States. The Center for Agricultural and Economic Adjustment at Iowa State University is concerned with all types of problems related to agricultural adjustment throughout the United States. The U. S. Department of Agriculture is actively engaged in research on southern agricultural adjustment problems and related research on capital and credit needs. However, the conference planners recognized early that the best understanding of capital and credit problems for



adaptation to a specific region's needs would come if the involvements were examined on a national basis.

Within the framework of current and prospective economic growth in agriculture, the general objective of the symposium and this book is to examine the capital and credit structure of agriculture (1) as it has performed in the past, (2) as it now exists, and (3) as it might be changed in years ahead to encourage needed agricultural adjustments.

It is our hope that research on and attention to these problems will be stimulated, not only on a state basis, but on a regional basis so that those who are guiding adjustments within agriculture will have the necessary information and analytical tools to guide farmers in making their adjustments.

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## Preface

THE 1940's and 1950's were characterized as an era of "farming with inflation." Farm real estate and total farm assets almost quadrupled in value during this 20-year period. Capital and credit problems were of secondary importance as agriculture's credit base expanded — a result of the year-to-year increase in market value of farm land. Farm real estate values — stable during 1959-60 — then turned downward. Therefore, if agriculture is to enter an era of "farming without inflation," the farm economy enters this new climate in strong financial condition. Even so, new credit standards become imperative to both lenders and farm borrowers. More importantly, capital and credit problems quickly become primary economic problems facing the individual farmer, farm lender, and the agricultural industry.

The symposium and the contents of this book are directed toward agricultural workers who are conducting research and educational activities in the land-grant colleges, public agencies, and credit agencies. The ideas have been developed in five closely related subject matter categories: (1) capital and credit in economic growth, (2) changing capital structure in agriculture, (3) credit market and institutions, (4) values and education in relation to capital use and productivity, and (5) selected research for improving use and productivity of capital and credit. They are presented in the interest of stimulating further research and educational activities on agricultural capital and credit problems as they are related to agricultural development.

It is our hope that the information and thinking presented herein will be useful in developing a rational approach to farm problems and in building a stronger agricultural industry. The problems confronting the farmer of the future are complicated and, in most cases, will be difficult to overcome.

Part I is concerned with the nature of the growth problems in agriculture, the determinants of capital formation, the basic structure of the capital market, indications of changes in capital productivity in different agricultural regions, and trends in credit. This introductory section provides the background for discussions on the effects of technology, vertical integration, and agricultural adjustments as they are related to capital and credit needs (Part II).

In Part III the authors are primarily concerned with evaluating our farm credit institutions and the functioning of the credit market. These evaluations serve as a basis for recommending improvements in the credit structure to meet changing needs in the different sectors of agriculture.

Since the recommendations for improvement dwell heavily upon the need for greater education of both borrowers and lenders, Part IV is devoted to chapters dealing with values, attitudes, and investments in the human factor. A better understanding of these considerations should enable agricultural workers and credit representatives to work more effectively with farmers in securing a more efficient use of capital. The goal, of course, is toward equalizing the productivity of agricultural capital with alternative uses for this capital in other sectors of our economy. It is hoped that the human factor as related to capital investments and the extension of credit will receive greater emphasis.

Chapters dealing with selected research on capital and credit problems are presented in Part V. It is anticipated that agricultural research workers will go much beyond the work reported here since there is a pressing need for such analytical research to serve as a basis for the development of a sound credit market designed to best serve a rapidly changing agriculture.

A debt of gratitude is owed particularly to those in the sponsoring organizations who made possible this symposium and its reporting in this book, and to the Iowa State University Press, through which publication was effected. Appreciation is extended to Mrs. Juanita W. Simms, Agricultural Economics Branch, Division of Agricultural Relations, TVA, for her fine cooperation in preparing the manuscript for publication, and to others of the secretarial staff in the branch.

The Symposium Planning Committee received many helpful suggestions from Joseph Ackerman, Farm Foundation; Leland G. Allbaugh, TVA; Malcolm Holliday, FHA; Ivy W. Duggan, Trust Company of Georgia; Russell C. Engberg, Farm Credit Administration; J. W. Fanning, University of Georgia; Carl P. Heisig, USDA; Arthur B. Mackie, TVA; and Norman J. Wall, USDA.

The planning committee believes that the information presented in this book should contribute materially to the improvement and expansion of economic research on capital and credit problems that could aid in bringing about sound adjustments in agriculture.

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April, 1961

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**PART I**

# **Capital and Credit in Economic Growth**

- ▶ **Agricultural Growth Problems**
- ▶ **Capital Formation**
- ▶ **Capital Market Structure**
- ▶ **Capital Productivity**
- ▶ **Capital and Credit Trends**



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## *The Economic Growth Problem*

**A**GRICULTURE HAS EXPERIENCED unprecedented changes in the technology and economics of production and marketing since 1940. This general trend is expected to continue at a rapid pace. Capital and credit in agriculture represent an important and somewhat neglected aspect of the substantial adjustment and economic growth problems facing American agriculture. These problems are important nationally, and they have some especially important implications for southeastern agriculture.

Changes in labor productivity of agriculture indicate to a large degree the extent of both capital-labor substitution and the adoption of yield-increasing technology. In 1958, for instance, output per farm worker was almost 90 percent above the 1947-49 average. This average rate of increase in farming productivity was more than three times the rate of increase in productivity in nonfarm sectors. A tremendous increase in the amount of capital used per worker has accompanied this rapid rate of change. The amount of capital per worker has been increased through a rapid transfer of capital among families in agriculture and the use of more nonfarm capital. Finally, the economic and technical changes in farming have been associated with a cost-price squeeze and relatively low aggregate levels of farm incomes. These income levels suggest increasing problems of capital accumulation and use of credit.

The growth in agriculture differs from the growth in the rest of the economy in many respects. Several characteristics of agriculture which differ, in degree at least, from most nonfarm industries include: (1) a higher rate of technological change; (2) inelastic demand for its products; (3) the difficulty of controlling production; (4) the "rugged individualism" of farm operators; (5) the chronic high level of underemployment of labor in some regions; and (6) a high degree of risk and uncertainty. The critical problems associated with future agricultural growth are efficiency in resource use and levels of living.

Problems of American agriculture arise from the growing interrelations with the nonagricultural economy, technological innovations in agricultural production, and the changing structure of demand for our farm products in the United States and foreign countries.

The current and prospective needs for adjustments within agriculture

are great and well known.<sup>1</sup> The adjustments of agriculture to changes in its economic and technical environment are a continuing process, and probably these adjustment pressures and needs will continue in future decades. Since agricultural adjustments are made largely for relatively long-run periods because of specified use and fixed investments, farmers must be aided and guided toward making the right kinds of changes (cf. Chapters 21, 23, and 24).

Considering some of the major trends that are occurring and are projected for the future, attention must be focused more clearly on capital formation in agriculture (Chapters 2 and 3) and the adequacy of the capital and credit structure of agriculture (Part III). Many people are of the opinion that the farm credit system for American agriculture is partly out of date, and that it should be adjusted to permit the guiding of changes that would foster an orderly development of our agricultural economy. Murray and Diesslin discuss this subject in Chapters 11 and 13. Studies dealing with farm adjustments throughout the United States indicate that capital is a crucial limiting factor which prevents farm operators from obtaining desirable returns for their management, labor, and investment.<sup>2</sup> That is to say, from the standpoint of the individual farm or area, increased farm income depends largely upon the extent and effectiveness with which the farm firm can use additional capital.

### NATURE OF NATIONAL AGRICULTURAL GROWTH

Any change in national economic growth requires adjustments in agriculture. Three broad types of farm adjustments generated by national economic growth are discernible. They are: (1) demand for farm labor, (2) development and production of nonfarm inputs for use in agriculture, and (3) demand for farm products.

Such changes encourage adjustments in agriculture, and in a highly developed economy such as that of the United States, agriculture will generally be faced with a cost-price squeeze; this results because its position is declining relative to that of other industries. Further, the growth of inputs produced in nonfarm sectors increases the output from

---

<sup>1</sup>The general problem and policies of American agriculture are discussed in detail elsewhere. For example, see *Problems and Policies of American Agriculture*, Iowa State University Center for Agricultural Adjustment, Iowa State University Press, Ames, Iowa, 1959; *Policy for Commercial Agriculture — Its Relation to Economic Growth and Stability*, Joint Economic Committee Report, 85th Cong., 1st Sess., Nov. 22, 1957. Also, there are many articles in leading journals, and in college and other public and private agency reports.

<sup>2</sup>See, for example, J. Gwyn Sutherland, C. E. Bishop, and B. A. Hannush, "An economic analysis of farm and nonfarm uses of resources on small farms in the Southern Piedmont, North Carolina," *N. C. Agr. Exp. Sta. Tech. Bul. No. 138*, May, 1959; A. B. Mackie, E. O. Heady, and H. B. Howell, "Optimum farm plans for beginning tenant farmers on Clarion-Webster Soils," *Iowa Agr. Exp. Sta. Bul. 449*, April, 1957; E. T. Baughman, "Contributions of credit policy to financing needed farm adjustments and to transferring ownership of farms," *Policy for Commercial Agriculture, op. cit.*, pp. 339-48; C. B. Baker and H. G. Halcrow, "Problems in agricultural reorganization," *Problems and Policies of American Agriculture, op. cit.*, pp. 97-113. The above represent a few of the many references that could be cited here.



agricultural resources (Chapters 6 and 7). This is one characteristic of a progressive economy. Well-developed economies are characterized not by how many, but by how few resources are employed in the primary industries. Consequently, as the national income or national product increases, the relative position of agriculture would be expected to decline.

(The significance and extent of the adjustments resulting from the increasing importance of other industries relative to agriculture depend partly on future growth and changes in population, technology, innovations, government and firm policies, and other factors.) When there is full employment in the economy, national economic growth tends to (a) encourage the substitution of capital and industrial products for farm labor and land, thus changing the input and cost structure of agriculture, and (b) to produce differential rates of change in the demand for farm and nonfarm products.

Major adjustments will be required as a result of forces operating within agriculture. Age, education, and financial position of farmers, for example, significantly affect the adoption of technology and increases in the size of farms. This point is developed more fully in Chapters 20 and 21. The internal agricultural adjustments are partly of a locational nature and result from changes in the competitive position of different regions in the production of different types of products. Since 1940 there has been a noticeable trend toward specialized production in a number of farm products at both area and firm levels. The relative competitive position of agriculture in a given region of the United States results from (a) price relationships, (b) adaptation of physical resource endowments to changes in technology and markets, (c) ability to accumulate capital, (d) nearness to market, and (e) the advantage of specialization or diversification of production.

(The relative significance of agriculture in the United States economy can be pictured in terms of population and percentage of national income since 1910. In 1910 about 35 percent of the total population of the United States was on farms.) This percentage had declined to 16.5 by 1950, and to 11.8 by 1958, and the proportion of the national income derived from agriculture declined at about the same rate.

(The proportion of the national income derived from agriculture was 16 percent in 1910. This percentage had declined to 8 percent by 1950, and to 5 percent by 1958. If the 1975 population projections of 220 to 230 million people for the United States materialize, the levels of farm population (8 to 10 percent) and farm income (3 to 4 percent) will continue to decline.) Farm population since 1940 has decreased relatively as well as in absolute numbers. Associated with this decline in farm population has been the decline in farm numbers. Data on changes in farm numbers are presented in Chapter 7, Table 7.5.

(Total farm output and the physical efficiency of resources used in farming have been increasing at a rapid pace. Farm output in 1959 was more than a fourth higher than it was in 1950. The 1958 output per unit of input was 23 percent above the 1947-49 average.<sup>3</sup>

<sup>3</sup> Agricultural Outlook Charts 1960, USDA, Washington, D. C., Nov., 1959, p. 50.



Rapid adoption of output-increasing technologies, coupled with the nature of demand, have resulted in lower farm prices. While average costs have been reduced, total costs have increased; since 1950, expenditures have absorbed a larger percentage of gross revenue. Since about 70 percent of gross revenues are used for production expenses, farmers are under constant pressure to maintain high levels of gross revenue. Further, the increased dependence on purchased factors of production has tied the agricultural sector more closely to the rest of the economy.

The rapid progress achieved in agriculture since 1940 has been associated with major changes in the cost structure of agriculture. The dramatic nature of these changes has been analyzed in a recent study.<sup>4</sup> In 1958 the farm family labor input was less than half the amount used during the 1930's. The total quantity of farm-owned capital had increased by one-third, while the use of purchased inputs and capital services purchased from the nonfarm sectors had increased by two-thirds (Table 1.1).

Table 1.1. Indices of Agricultural Inputs, 1910-58  
(1947-49 = 100)

Years	Farm family labor	Farm-owned capital	"Purchased" inputs <sup>a</sup>	Total
1910-19	148	96	58	88
1920-29	149	90	70	94
1930-39	139	91	70	92
1940-49	115	88	93	100
1950-58	79	120	112	102
1958	64	128	117	101

Source: R. A. Loomis and G. T. Barton, *Productivity of Agriculture, United States, 1870-1958*, USDA, Tech. Bul.

<sup>a</sup>Includes both materials and services purchased from nonfarm sectors and rent and interest on nonfarm-owned capital.

Farm family labor has declined while capital and purchased inputs have increased. As a result, each unit of farm operator and family labor now uses three times more capital and nearly four times the purchased inputs and capital services it used in 1930. (Figure 1.1). Related data are presented in Chapters 6 and 7.

Changes in the averages overstate somewhat the changes occurring on commercial farms in many regions. Much of the labor resources withdrawn from agriculture has come from small farms with very small capital investments. Withdrawal of these farms would tend to increase the average size of farms even though no changes occurred in the larger commercial farms. Substantial changes have occurred on commercial

<sup>4</sup>R. A. Loomis and G. T. Barton, *Productivity of Agriculture, United States, 1870-1958*, USDA, Tech. Bul. (In press.)

farms, however. In 1959, for example, the value of farm capital on selected commercial farms ranged from 3-1/2 to more than 5 times the value in 1940 (Table 1.2). Expenditures in 1959 also were at 3 to 4 times the 1940 level (Table 1.3). In general terms, somewhat more than half of these increases are associated with increases in costs.)

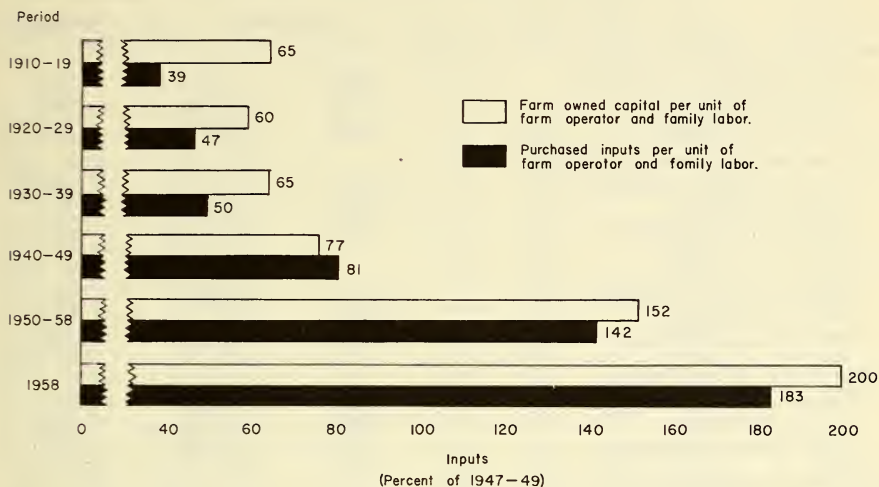


Fig. 1.1. Agricultural inputs per unit of farm operator and family labor, 1910-58 (1947-49 = 100).

Our rapid growth in farm output and productivity is related to the technological revolution in agriculture and to the increased use of non-farm inputs. About 55 percent of the inputs used in agriculture come from nonfarm sources.<sup>5</sup> These nonfarm inputs have the following three important effects:

1. Use of nonfarm inputs generally increases output per farm and in total. This is particularly true when shifting from animal to tractor power and when increasing the use of fertilizers and pesticides. However, most types of nonfarm inputs tend to increase product per acre and per unit of livestock.

2. The characteristics of nonfarm inputs impede commercial farmers in changing from production to nonproduction during short periods of time. Many nonfarm inputs represent capital investments for use over a number of years. Capital charges, depreciation and repairs on farm buildings, power, and machinery account for more than half of the annual nonfarm inputs in the United States. To a large extent, "fixed" labor resources are replaced by "fixed" machinery and equipment investments. Thus, even large-scale farms have a relatively low proportion of inputs that can be classed as variable.

<sup>5</sup> Loomis and Barton, *op. cit.*

Table 1.2. Value of Capital Per Farm, Specified Types of Commercial Family-Operated Farms, 1940 and 1959

Type of farm	Average value		1959 as a percent of 1940
	1940	1959 <sup>a</sup>	
	(Dollars)		(Percent)
Dairy farms, Central Northeast:			
Total farm capital, January 1	9,600	38,750	404
Land and buildings	5,300	20,550	388
Livestock and equipment	3,400	15,430	454
Hog-beef fattening farms, Corn Belt:			
Total farm capital, January 1	20,990	75,420	359
Land and buildings	14,220	48,120	338
Livestock and equipment	4,860	21,100	434
Cash-grain, Corn Belt:			
Total farm capital, January 1	31,470	112,280	357
Land and buildings	26,250	93,930	358
Livestock and equipment	2,900	10,830	373
Cotton farms, Black Prairie:			
Total farm capital, January 1	8,820	34,210	388
Land and buildings	7,240	28,420	393
Livestock and equipment	1,320	5,320	403
Cotton farms (irrigated), High Plains, Texas:			
Total farm capital, January 1	24,120 <sup>b</sup>	107,850	447
Land and buildings	18,300	96,300	526
Livestock and equipment	4,900	10,840	221
Southern Piedmont:			
Total farm capital, January 1	4,760	20,430	429
Land and buildings	3,670	17,010	463
Livestock and equipment	880	2,920	332
Tobacco-cotton farms, North Carolina:			
Total farm capital, January 1	6,770	24,530	362
Land and buildings	5,500	20,000	364
Livestock and equipment	1,080	3,790	351
Wheat-small grain-livestock farms, Northern Plains:			
Total farm capital, January 1	10,830	57,610	532
Land and buildings	7,230	33,980	470
Livestock and equipment	2,710	16,840	621
Wheat-pea farms, Washington and Idaho:			
Total farm capital, January 1	35,970	183,810	511
Land and buildings	29,060	155,000	533
Livestock and equipment	4,620	22,020	477

Source: Tabulated from studies of costs and returns by type of farm made in the Farm Economics Research Division, ARS. See USDA Info. Bul. 176, Revised, 1959.

<sup>a</sup> Preliminary.

<sup>b</sup> 1944 data. First year of study.

Table 1.3. Cash Expenditures for Specified Types of Commercial Family-Operated Farms, 1930-58

Farms									
Year	Dairy	Corn Belt		Tobacco-cotton	Cotton		Spring wheat	Winter wheat	
	Central Northeast	Hog-beef fattening	Cash grain	North Carolina	Southern Piedmont	Black Prairie, Texas (Irri.)	High Plains, Texas (Irri.)	Wheat- small grain- livestock	Wheat- pea Washington and Idaho
(Dollars)									
1930	2184	2962	1876		933	852		1776	
1931	1704	2125	1523		660	717		1095	
1932	1340	1755	1244		469	533		1077	
1933	1346	1506	1134		557	667		866	
1934	1539	1764	1193		648	575		887	
1935	1661	2544	1494		680	650		1439	<sup>a</sup> 2865
1936	1798	2089	1671		734	768		1042	3423
1937	2149	2661	1936		857	1037		1547	3470
1938	2016	2741	1971		722	851		1421	3345
1939	2078	3124	2031		786	825		1419	3097
1940	2241	3576	2224	<sup>a</sup> 1143	861	946		1641	3612
1941	2534	4007	2426	1369	870	1053		2044	3896
1942	2874	4652	2717	1757	1130	1232		2448	4916
1943	3219	4967	2897	1890	1260	1399		2844	4938
1944	3873	5355	3359	2487	1402	1623	<sup>a</sup> 5707	3181	4891
1945	3954	5728	3519	2662	1448	1618	4387	3478	4674
1946	4308	6911	3998	3423	1785	1869	6130	3695	6093
1947	4830	8225	4511	3493	1808	2711	10,108	4816	7526
1948	5558	11,102	5045	3536	2021	2914	9864	5497	7363
1949	5175	10,122	5281	3486	1889	3736	11,982	4999	6462
1950	5409	11,590	5518	3880	1868	2833	10,067	5117	7170
1951	5804	13,438	5906	4707	2533	3471	13,403	5888	8533
1952	6140	12,775	6071	4425	2697	3814	14,476	5317	9753
1953	6110	11,122	6254	4360	2965	4604	14,415	5365	8895
1954	5964	12,628	6426	4554	2531	3269	14,698	5181	9532
1955	5844	11,937	6408	4704	2758	3734	15,391	5536	10,018
1956	5966	11,341	6464	4508	2362	3085	15,328	5344	10,413
1957	6600	12,871	6743	3745	2212	3229	13,239	5264	10,804
1958	7130	14,842	7092	4185	2425	3491	14,046	5950	10,988

Source: Tabulated from studies of costs and returns by type of farm made in the Farm Economics Research Division, ARS. See USDA Info. Bul. 176.

<sup>a</sup> First year of study.

3. In general, use of nonfarm inputs increases earnings of the individual farmer even in periods of low prices, as most nonfarm inputs have a high marginal productivity per dollar of increased expenses. Heady develops this point in Chapter 7.

Because of these three effects, commercial farmers tend to strive for an expanded total output. Operators respond to favorable price and income relationships by (a) increasing the use of nonfarm variable inputs, such as fertilizers and pesticides and (b) making new capital investments to increase intensity of operations or to enlarge units for more efficient operation. More capital-intensive uses of land are encouraged.

Many farmers lag in adopting new technology even under favorable



income conditions because they lack knowledge about its effects; sometimes they cannot or will not obtain needed finances, take the added risks, or acquire the necessary technical and managerial skills. A more detailed development of this subject is presented in Chapters 20 and 21. Adoption of new technology usually reduces costs per unit of output, but as indicated, it usually increases total output. Most farmers respond to cost-reduction opportunities by adding inputs to their existing stock of resources. The increased output will mean more income to the individual farmers. That is, each farmer responds to a horizontal demand curve, usually without realizing that the over-all increased output resulting from the widespread adoption of new techniques will eventually depress prices. But even if the consequences are foreseen, an individual farm operator who increases his output thus maximizes his returns.

Once total output has expanded, it does not shrink when prices fall and costs rise. This phenomenon results because individual farmers usually cannot increase their net incomes by reducing output.<sup>6</sup> In some cases, a change in enterprises may increase net incomes. Farmers will quit farming only if their returns from alternative employment, plus the returns from salvaging investments in "fixed resources," exceed their expected returns from farming. If they liquidate machinery, livestock, and equipment in order to take nonfarm employment, they will lose heavily on their original investments. Consequently, most farmers continue in the hope of more favorable future developments. Farmers who liquidate will sell to others who will buy the resources at lower costs; and in the short-run the new owners are likely to use them at the same or higher levels of intensity.

Meanwhile, farmers who have not adopted the new improvements have acquired more knowledge. Most important, they usually find that the marginal productivity of additional capital, even at lower product prices, is still high enough to yield a net return. For the individual farmer who is operating a going concern, the adoption of these technological developments will likely continue to pay. Many farmers are only partly adjusted to current technology and prices. The marginal returns of another insecticide application or another 40 acres of cropland, for example, can be very high. Other farmers can increase incomes through major changes in their farming systems. An analysis by Johnson and Bachman indicates the returns per dollar of added expense that farmers in eight typical situations would receive by adopting systems recommended by research economists. Price ratios of 84 to 90 were used in these studies. The calculated net returns per dollar of added expense, including interest and depreciation, ranged from \$1.50 to \$2.72.<sup>7</sup>

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<sup>6</sup>G. L. Johnson, "Supply function — some facts and notions," *Agricultural Adjustment Problems in a Growing Economy*, E. O. Heady, H. G. Diesslin, H. R. Jensen, and G. L. Johnson, eds. Iowa State University Press, Ames, Iowa, 1958, pp. 74-93.

<sup>7</sup>S. E. Johnson and K. L. Bachman, "Recent changes in resource use and in farm income," *Problems and Policies of American Agriculture*, Iowa State University Center for Agricultural Adjustment, Iowa State University Press, Ames, Iowa, 1959.



How have these changes in technology and prices of resources affected capital use? How are they affecting the capital and credit problems of American agriculture? These questions are analyzed in Chapters 6 and 7.

### ECONOMIC GROWTH AND FARM SIZE ADJUSTMENT

Much of the economic growth problem in agriculture is related to the development of sizes of farms that will effectively utilize modern technology and production methods. American agriculture is characterized by a wide diversity in the nature and size of its farms (see Chapter 4). Marked adjustments have occurred in numbers and sizes of farms, but rapid changes have also occurred in the sizes of farms needed to utilize effectively the developments in machinery, equipment, and other technology.

In broad outline, the total number of farms and the number of commercial farms have declined progressively since 1930. The number of part-time and residential farms increased until 1950. Since 1950, the number of these noncommercial farms has declined also.

Since 1940 the number of commercial farms has declined rapidly.<sup>8</sup> The most rapid decline has been in the small-scale commercial farms (Economic Classes V and VI) which produce less than \$2,500 worth of products for sale at 1954 prices. At the other end of the size scale, numbers of Classes I and II farms, or those that produce over \$10,000 worth of farm products for sale at 1954 prices, have steadily increased. Numbers of farms in Economic Class II increased until 1950, but have been declining since that time.

Some reasons for these trends in the context of a growing and prosperous nonfarm economy become apparent if one considers how much a farmer must sell to obtain a specified income. Recent studies of resource use under projected prices indicate that in several type-of-farming areas sales totaling more than \$12,000 would usually be needed to provide incomes of \$3,500 to operator and family labor.<sup>9</sup> From the standpoint of volume of sales, these farms were generally comparable to the farms in Economic Class II. The projected income of \$3,500 is more than \$500 below the median earnings of semiskilled workers in industry. Further, nonfarm earnings are increasing each year, and by 1975 they are expected to increase nearly 50 percent.

Capital investments on most of these farms ranged from about \$30,000 to more than \$100,000. Average investments in 1954 for Economic Class II farms in selected areas and by types of farms are shown in Table 1.4. Investments for selected farms ranged from \$50,000 to

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<sup>8</sup> J. V. McElveen, *Family Farms in a Changing Economy*, USDA Info. Bul. 171, Mar., 1957, p. 19.

<sup>9</sup> J. M. Brewster, *Farm Resources Needed for Specified Income Levels*, USDA Info. Bul. 180, 1957.

\$100,000. In terms of 1960 dollars, these investments would be somewhat higher because of the higher prices of land, machinery, and equipment.

Table 1.4. Capital Investment on Class II Farms

Type of farm and area	Average value of investment 1954
	(Dollars)
Cotton farms:	
Eastern Coastal Plains	45,887
Mississippi-Alabama hilly area	58,173
Delta area	53,685
High Plains area	64,005
Western irrigated area	67,270
Wheat farms:	
Central Oklahoma-Kansas	89,190
Red River Valley	71,716
Washington-Oregon	102,304
Dairy farms:	
Gulf Coast	44,267
Nashville Basin	48,304
Northern Lake	48,308
Livestock farms:	
Central Corn Belt	73,035
Eastern Corn Belt	69,275
Western Corn Belt	68,004

Source: Data tabulated from the following U. S. Census-ARS Special Reports: "Cotton producers and cotton production," by R. B. Glasgow; "Dairy producers and dairy production," by P. E. McNall; "Cash grain and livestock producers in the Corn Belt," by E. G. Strand; and "Wheat producers and wheat production," by A. W. Epp.

Adjustment in size of farm is a major problem connected with the economic growth of U. S. agriculture. In 1954 only about 20 percent of the commercial farms had a volume of sales of \$10,000 or more. Nearly 60 percent had a volume of sales under \$5,000.

The economic pressure for farm expansion is lessened in different ways because of the circumstances under which farmers operate. For example, if a farmer has an excellent equity position and is a good manager, he will not risk much while expanding his operation, either by land acquisition through purchase or rental and/or more intensive production. But a farmer who operates a relatively small farm and who has very little capital assets has a small base from which to expand and/or adopt newly developed technologies of production. This type of farmer may be an excellent manager, but he cannot risk incurring a large indebtedness. Even if he wanted to expand his business, would credit agencies be willing to see him through his major adjustment period? This problem is discussed by Hendrix and Lanham in Chapter

14. A decision to finance this type of farmer is one of seeing him all the way through, perhaps with a complete financing "package deal." This idea is advanced and analyzed in Part III. If this financial help cannot be obtained, such a farmer must resort to dissipating his savings; thus he cannot set aside reserves for equipment replacement and building repair in order to remain in business. The third type of farmer can make the financial adjustments, but is reluctant to incur indebtedness and/or adopt the latest technologies of production. Coutu and Lindsey discuss this type of individual who has a strong "aversion to change" in Chapter 21. Perhaps this type of farmer should give strong consideration to some land rental arrangement. The big question here is whether such farmers can make capital-oriented adjustments from future gross revenues.

Farmers have very little control over prices paid for purchased factors of production. Many external forces determine these prices, such as: wage levels, the fiscal and monetary policy of our government, the costs of raw materials that are used to manufacture the input, transportation costs, and the like. The farmer is faced with continually increasing prices for these factors of production, and in addition, he is buying more of these inputs. Such a trend is a natural result of the rapid change to a highly scientific, mechanized type of agriculture. The combination of these two trends results in greater outlays for these purchased inputs. At the same time, increased output forces down agricultural product prices, and thereby, gross farm incomes. The total demand for farm products can be expected to increase with population, but at a much slower rate than the increased demands for nonagricultural products.

Farmers, and especially southern farmers, find themselves in a difficult situation. In the past, farm operators could plan to expand their business slowly, mainly from net revenues. The main line of credit was short-term, thus enabling farmers to maintain a high equity ratio. Conditions have changed because of technological progress, coupled with unfavorable price-cost relationships. As a result, needs for fixed intermediate- and long-term commitments are increasing. The problems of credit needs and credit availability are discussed in Part III and Chapters 25 and 26.

## ECONOMIC GROWTH, FARMERS' VALUES, AND EDUCATION

How a farmer looks upon change depends upon his values, the resources at his command, and his ability to use these resources to accommodate change. Discussions in Chapters 19 through 21 are relevant to this subject. Problems arise because farmers react differently to growth problems, and growth affects different groups of farmers differently. It is evident that great disparities arise among the different groups of farmers. The farmer who was considered to have a good-sized farm and was obtaining a desirable level of income in 1945 or



1950, might have been operating a marginal farm and just eking out a subsistence level of living in 1959. On the other hand, operators who managed relatively small-sized units in 1945 might have been operating a farm in Economic Class I or II in 1959. Such a situation is more of an exception than the rule. It is more customary to see large commercial farms getting larger and their numbers increasing, and the number of relatively small-sized farms decreasing.

The general growth of our economy calls for continuing improvement in the quality of human resources, thereby increasing their alternatives for employment in nonagricultural jobs; and for those who continue to operate commercial farms, a greater opportunity to adjust to technological and economic changes. Discussions in Chapters 4, 22, and 23 develop this point more fully. Many farm operators, however, were not fortunate enough to enter farming at the "right" time. These less fortunate commercial farmers were unable to build a sufficient equity base to obtain enough intermediate- and long-term credit for expanding their farm business. Then, too, a longstanding philosophy in farming has been that it is "bad" to be in debt, and that farm loans should be fully amortized (cf. Chapter 20). Of necessity, some of these attitudes are changing, e.g., a greater acceptability of land rental as a sound management practice, as in Great Britain.

An important element of economic growth is that there be enough labor to supply an enlarging industry. Agriculture has served this aspect of economic growth well throughout our history. However, this outmigration of labor from agriculture is a form of capital export to other sectors. Those who leave agriculture for nonfarm jobs are usually the better-equipped young adults who have the ability to farm successfully. What type of capital investments should our society make in training these farm youngsters so that their productive potential will be fully developed regardless of the work they finally obtain? Mackie answers this question in Chapter 22.

Many farmers who cannot make a desirable living in agriculture are at a crossroad. They might be able to reorganize their farm business if capital were provided for the needed adjustments. On the other hand, such farmers are faced with sunk assets that cannot readily be converted into assets of a more liquid form; hence they appear to be helplessly frozen to agriculture (cf. Chapter 14).

Migration of labor out of agriculture results directly from a lack of economic opportunities for people in agriculture. In order to operate a farm in the future, increasing amounts of capital will be needed (Chapter 5). Our farm credit system must be set up to carry beginning farmers — those who possess the attributes for success — over relatively long periods; otherwise, farming will truly become an occupation dependent upon inheritance and/or the "right" marriage. We should not overlook the strong possibility that many of our family farms may incorporate in order to finance adjustments. Credit managers who can think in terms of financing the farm business over a long period under sound farm management, rather than financing a particular farm enterprise, may

play an important role in developing a sound agriculture that can withstand periods of "shock." This point is emphasized by Murray, Diesslin, et al. in Part III.

Vertical integration or contract farming has been advocated by some as a desirable device to minimize risk and uncertainty and psychological factors retarding economic growth of special groups of farmers. A detailed discussion of this subject is presented in Chapter 8. In general, the over-all objective of the integrator is to obtain an expanded market for his products and/or services; hence, we can expect these firms to be strong advocates for rapid adoption of technological innovations by farmers. Since the farmer is constantly pushed to increase efficiency in production, he will continue to make these types of capital investments. Of course, there is the danger of too rapid capital investments, which can weaken the financial structure of the farm business and make the farmer greatly vulnerable to unfavorable price-cost relationships.

On the product side, firms are demanding greater standardization of products through specification buying. Various arrangements are being developed to insure processors and marketing firms desired volumes of the "right" kinds of farm products. This trend has further intensified the need for farmers to farm more scientifically and in most cases to increase the capitalization of their businesses. This development in the growth of our nation has widened the gap between the consumer and the farmer. Usually, these integrated production-marketing arrangements provide needed capital along with management assistance.

The attitudes of farmers, the problems of adequate education for farm people, and problems in capital acquisition are particularly vital aspects of economic growth from the standpoint of capital and credit problems. Part IV and Chapter 24 are devoted to these problems.

Another phase of education is an increased research effort to analyze the economic growth problem in agriculture, and particularly the problem of use of capital and credit. Farm adjustment research considers the restrictive effects of capital on farm income. However, there are many opportunities to conduct more comprehensive studies that would indicate the productivity of capital used in different forms in different farming systems in the major farming regions of the nation. Tolley presents his views on needed research in this area in Chapter 27.

Such research and the educational programs based on these research results would enable farmers and those in a position to extend farm credit to make more intelligent decisions on the extent of reorganization possible and the level of resulting incomes that could be expected. This credit-centered research could also point the way for needed changes in the farm finance structure to accommodate orderly adjustments by the nation's commercial farmers. In many instances, such research would more clearly help low-income farmers analyze their own opportunities for continuing in agriculture as compared with alternative forms of employment. There is a continuing need for research to determine how capital already committed to farming, and capital from other sources that may be committed to farming, can be utilized more efficiently so



that the returns will compare favorably with returns from other forms of investment. Such research should include the effects of investment on farm output and rates of aggregate investment consistent with the growth in output needs. This information will be helpful in making an intelligent determination of how much investment can be restored to agriculture relative to the rest of the economy.

Other studies that deal with attitudes of farm families toward the use of credit would help our educational workers and credit representatives to know their clients better, and hence would aid in breaking down barriers to more effective use of outside capital by the farm firm. Part V is concerned with the above-mentioned considerations.

### NATURE OF SOUTHERN AGRICULTURAL GROWTH

While the Southeast appears to have lost its competitive position in the production of cotton, it seems to have gained in the area of livestock production. The changes that have occurred have forced southern farmers to acquire more capital, land resources, technical knowledge, and managerial ability. Since most small-scale and low-income farms are in the South, the needed adjustments have been more difficult to achieve in this region than elsewhere.<sup>10</sup> By the same token, more people in southern agriculture have been affected by the economic pressures exerted by structural changes than elsewhere in the country. The problems of small farms, lack of education, low income, inadequate capital resources, and a surplus of farm labor make the job of agricultural and resource development in the Tennessee Valley and Southeast very difficult.

According to the 1954 Census of Agriculture, there were 4,783,021 farms in the United States. Of this total, 30 percent, or 1,455,404, were part-time and residential farms, and 26 percent, or 1,225,775, were small commercial farms — Economic Classes V and VI. Thus in 1954, 56 percent of all farmers received gross farm incomes of less than \$2,500.

Twenty-six percent of all farmers in the United States in 1954 had gross farm sales of less than \$2,500, with farm income exceeding non-farm income, and with operators working less than 100 days off the farm. Of these 1.2 million farms, 63 percent were in the South. Of the remaining 37 percent, only 5 percent were in the West. Except for southern Missouri, parts of the Middle West and Northeast, and the cutover lands of the Great Lake States, the low-income farms are largely located in the South. In 1954 these 1.2 million farmers had gross farm sales of \$1.8 billion — or 7 percent of all farm products sold in the United States. Thus, less than half, or 44 percent, of all farmers had gross farm sales of more than \$2,500, and they produced 91 percent of the farm products. In the TVA region, only 15 percent of

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<sup>10</sup> A. B. Mackie and E. L. Baum, "Programs for commercial farmers with low incomes," *Problems and Policies of American Agriculture*, *op. cit.*, pp. 406-29.

the farmers had gross farm sales of \$2,500 or more in 1954, and these farmers produced 68 percent of all farm products.

Within the South, the highest proportion of the low-income farms are in the southeastern and Delta cotton areas and the general farming areas of the Appalachian Mountains. In these areas, nearly half of the commercial farms are small-scale units. Many older people and many people with low levels of education live on these farms, as indicated by Mackie in Chapter 22.

There is general agreement that the cause of low farm incomes is lack of adequate productive resources, especially land, capital, and in many instances educational training. Ownership and/or control of capital and land, along with improved levels of education, are thus prerequisites for production and, hence, farm income. Of course, management of productive resources is important with respect to the level of production efficiency, once the control of resources has been acquired.

It has been stated that the causal relationship of low income and low capital per worker has been the primary reason for the existence and persistence of low farm incomes. That is, low incomes remain excessively low largely because of the low level of capital available per worker, and the inadequate amount of capital is largely a consequence of low income. Therefore, low-capital and low-income farms in historically less prosperous farming regions, such as in the Southeast and the Tennessee Valley, tend to remain inefficient and low-producing units.

Historically, it has been shown that since 1870 gross capital formation in agriculture has been very closely related to gross income.<sup>11</sup> This remarkably consistent relationship of gross capital formation to gross income emphasizes the importance of the latter, both as a source of new capital and as an incentive for investing new capital. Thus, we could conclude that the prospect for acquiring new capital by Classes V and VI farms would be very dark indeed. There are indications, however, that a family's present net worth has very little relationship to its capacity to use capital efficiently and to save when it has a good opportunity to do so.<sup>12</sup>

The number of farms in the South is expected to decrease at a greater rate than in other regions.<sup>13</sup> Associated with increasing emphasis upon livestock production, there is expected to be a gradual shift in the pattern of land use. An increased acreage of cropland is expected to be pressed into forage production. Grain production should increase some, but not in direct proportion to the increase in livestock production. Two factors are affecting and will continue to affect the rate at which grain production will be increased in the region. These are (1) the availability of and access to midwestern grain that may be brought into the region at economical rates by barge transportation, and (2) the

<sup>11</sup> Alvin S. Tostlebe, *Capital in Agriculture: Its Formation and Financing Since 1870*, Princeton University Press, Princeton, N. J., 1957, p. 98.

<sup>12</sup> *Ibid.*, pp. 149-51.

<sup>13</sup> J. M. Brewster, "Long-run prospects of southern agriculture," *Southern Econ. Jour.*, Vol. 26, No. 2, Oct., 1959, pp. 134-40.

development of high-yielding forages and forage fertilization in the southern region, which makes some livestock production possible with a minimum grain requirement.

If the TVA region and southeastern agriculture is to achieve the necessary and desirable adjustments in the years ahead, the capital and credit needs should be appraised, and the current credit facilities examined to determine whether they will meet the ever-increasing capital needs of the future, as suggested in Part III.



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## *Determinants of Capital Formation—Conceptual and Factual Considerations*

A GOOD UNDERSTANDING of the capital and credit problems in a changing agriculture is secured through a recognition of the determinants of its capital formation. The purpose of this chapter is to provide a conceptual and factual background for the capital formation process in American agriculture against which the specific research findings and problems of farm capital acquisition will be subsequently explored.

This presentation has been divided into three sections: (1) a review of the meaning of capital and the process of capital formation; (2) identification of the sources of farm capital and an examination of the relative importance of these sources; and (3) a brief description of the problems considered to be of primary importance in the farm capital formation schema, considering the above theory and experience, and in connection with some current research.

### PROCESS OF CAPITAL FORMATION IN AGRICULTURE

#### Meaning of Capital

Used in production. Probably the most common definition of capital is, simply, a tool of production. Such a meaning is concise and communicable; furthermore, it appropriately designates one of the prime characteristics of capital, namely, the use of something in production. There is little confusion about this definition except with reference to aggregations of assets. At times an accumulation of financial assets or of unused stores of equipment are included in a tally as capital. To be sure, both are savings, but savings are not synonymous with capital. Herein lies the basic fallacy of mercantilism.<sup>1</sup>

The differentiation between capital and financial assets is relatively simple, but a separation of unused capital goods from true capital is difficult, particularly at the firm level. Suffice it to recognize here,

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<sup>1</sup> Thomas Mun, "England's treasure by foreign trade," reprinted in *Masterworks of Economics*, L. D. Abbott (ed.), Doubleday & Company, Inc., Garden City, N. Y., 1947, p. 26.

however, that substantial amounts of unused goods in the form of land, equipment, and buildings on the farms across this nation, though considered wealth, never really enter the wealth-producing stream as capital, and hence contribute nothing to raise a depressed level of living. Thus, the simplified definition of capital (tool of production) does imply the important characterization of use in further productive effort.<sup>2</sup> On the other hand, it also erroneously implies that all capital takes a physical form to be used by the hand of, but apart from, man; furthermore, it leaves the origin of capital untold. Capital does not seem to have a distinctive form, but rather is distinguished by purpose of use.

Some useful differentiations are included in the following portion of an outline designed to identify capital:

- I At the most general level, phenomena are either human or nonhuman environment.
  - A. Within this environment, phenomena are either economic (used for satisfying man) or those not presently useful.
    - (1) Within economic phenomena, goods and services are either produced by man's efforts or not produced (such as the sun's radiation).
      - (a) Within produced goods and services — if indeed further delineation can be made — items are used for consumption, or for further production, namely CAPITAL. Its form is not distinctive.

Results from past production. A re-examination of the traditional tripartite factors of production as either land, labor (including management), or capital is in order. First, why was land separated from capital? Possibly the heritage of the ancestral physiocrats was too strong. If all wealth rises from the soil like geysers erupting from the bowels of the earth, then indeed, land has a distinct logical category. But is land any more distinct from capital as a factor of production than is livestock?

Land, as used since the beginning of farming, has been a produced good — produced by the endless human toil of discovery, combat against hostile elements, claiming, clearing, preparation, and painstaking improvement. Even the "free" distribution of land in the homestead grants was in recognition of such effort as one of the conditions for title. Thus, perhaps the last vestige of physiocracy should be wrested from production theory and land should take its place as an integral part of a capital base, subject to the same economic principles of acquisition and use as other capital goods.<sup>3</sup>

But what is the line of demarcation between labor and capital? Is capital always a physical good in the hand of labor or management?

<sup>2</sup> Probably recognized in true perspective first by E. V. Bohm-Bawerk in his *Positive Theorie des Kapitals*. See English translations in S. H. Patterson, *Readings in the History of Economic Thought*, McGraw-Hill Book Co., Inc., New York, 1932, pp. 353-78.

<sup>3</sup> Alfred Marshall, *Principles of Economics*, 8th ed., Macmillan & Co., Ltd., London, 1946, Book IV, p. 144.



Certainly these are crucial contemporary issues in capital theory which need clarification. A related theoretical dilemma plagued political economy for years — namely, the labor theory of value representing labor as the sole source of economic value. Remnants of this postulate may still survive to confuse the above question.

The traditional distinction between capital and labor is apparently a recognition of the “natural class” differences between human and non-human elements, a difference not so clear in the production process. In addition, the traditional distinction between consumption and production, or investment, is whether an economic good or service goes the route of direct human use or the route of use in a production process. Perhaps a more accurate representation of consumption is maintenance of labor and management.

A unique part of consumption vital to both labor and management is knowledge, both technological and general. Knowledge certainly originates from past productive effort, and is indeed used to further production. Improvement in knowledge is hardly mere maintenance; labor and management could continue at a given level of production without it. One important means for improving the productivity and level of living of many farm people is that of their learning about capital use and production technology, alternative skills and jobs, and even political and social organization (cf. Chapters 4, 22, and 23). These uses of past production for improved labor and management, though commonly termed consumption, seem clearly to possess the afore-identified characteristics of capital.<sup>4</sup>

Saved from consumption. A recognition that the raison d’être of production (or income) is partly consumption leads to a final prime characteristic of capital, namely, a rescue of past production from consumption. If all production is consumed (used for maintenance), the chances for capital formation are negligible. Economic goods not so consumed are indeed saved from consumption, but all goods saved do not become capital. At both the micro- and macro-levels, saved production can terminate in deterioration, obsolescence, or nonuse.

A definition of capital proposed. Could a working definition of capital for these discussions on capital problems of agriculture now be hazarded? Capital is produced goods and services saved from consumption (maintenance and direct satisfaction of man) and used by, or as a part of, the human agent in further production.<sup>5</sup> The difficulty of separating the use of goods and services as consumption for labor and management on one hand and as capital (education) for improvement in the agent on the other is again emphasized. However, this distinction

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<sup>4</sup> M. Abramovitz, *Resource and Output Trends in the United States Since 1870*, Occasional Paper 52, National Bureau of Economic Research, 1956.

<sup>5</sup> The combined meanings of capital as offered by two contemporary theorists approximate this definition though each seems to leave out an important and different aspect. K. E. Boulding, *Economic Analysis*, Revised ed., Harper & Brothers, New York, 1948, pp. 654f; P. A. Samuelson, *Economics; An Introductory Analysis*, 3rd ed., McGraw-Hill Book Co., Inc., New York, 1955, pp. 40f.

seems vital enough to the future economic well-being of the farm population to advance it. To consider improvement in the human agent as capital seems most functional when the investment is made by a firm, by individuals for themselves, or by the general public. Such expenditures for children by a family or local government seem impossible to handle functionally except as consumption for maintenance, discharge of responsibility, and enjoyment.

Capital formation itself can be viewed as either net or gross. Though all capital is product saved from consumption and used in further production, an important portion of it replaces each time the previously existing capital that has been "used up," has depreciated, or that has otherwise lost its value as a productive agent. Thus all savings actually being transferred into productive use are considered gross capital formation; that portion of the gross capital which adds to the total value of the capital base is net capital formation.

### Capital Formation Process

The level of capital formation in an economy, as now defined, is dependent upon certain processes: production of goods or services (for both direct enjoyment and as intermediate products); an excess of such production over consumption (savings); and utilization of this saved product in further production (investment).<sup>6</sup> A failure at any stage can thwart the capital formation process. A closer examination of certain segments of the capital formation process is presented below so as to secure a better understanding of the farm capital problems.

Savings process and the farmer. Generally, production or income can be viewed as terminating in either consumption or savings.<sup>7</sup> They are complements for each other. The relevant question, then, is: What determines the size of either? Few questions have plagued the economic theorists more. However, the preponderance of evidence seems to point to consumption as the independent element — a propensity to consume. What is not consumed is savings, a residual.<sup>8</sup> Numerous factors, such as (1) expectations of future price levels and earnings, (2) cultural heritage, and (3) past experience of consumption, affect this tendency to consume, but probably the dominant factor is the level of income or production. Viewing the relation of individual earning and spending units, the higher the income, the smaller the proportion of income

<sup>6</sup> The effort here is not to offer a complete, thoroughly integrated, and fully documented theory of capital formation; such far exceeds the needs of, or space allotted to, this discussion. It might be simply indicated that the following factors, in addition to amount of capital, affect production: quality of original resources, level of knowledge and technology, values of population, stability of socio-politico-economic system, and historic chance.

<sup>7</sup> A third alternative is public taxation and expenditure which can affect the level of economic activity and, hence, capital formation. However, production and income here are exclusive of taxes, over which the private sector, individually, has little control.

<sup>8</sup> J. M. Keynes, *General Theory of Employment, Interest, and Money*, Macmillan & Co., Ltd., London, 1936, Books I and III.



consumed. So much income is "needed" to maintain labor, management, and family replacements and to achieve the current socially acceptable level of living; only then do affluency and excess income appear.

Thus, farmers' potential for capital formation or savings is substantially influenced by their levels of income. Farmers' incomes are low by comparison with most other producing units in the economy, as has been pointed out in Chapter 1. Low income not only hampers the formation of capital goods, but also that capital which takes the form of education and technology. What is most surprising is the magnitude of the capital formed in agriculture in spite of the dearth of savings potential. This herculean feat among farmers calls for a modification in the usual concept of the propensity to consume. Evidence points to a tendency of lower consumption by farm earning units at given levels of income when compared with nonfarm families.<sup>9</sup> Due to divergent values, unique social environment, or perhaps investment and replacement obligations, farmers' decisions on allocation of income result in a higher savings rate. However, it is doubtful that such a practice can offset the low levels of farm income. Agriculture may well have to look to non-farm sources of saved production for a part of its needed future capital.

Availability of savings to agriculture. A second aspect of the capital formation process important to agriculture is the availability of savings for use as farm capital. Savings must precede capital formation, but it does not follow that the investor must be the source of savings. The saver may be unwilling or unable to use his savings for capital, yet willing to allow others to use these savings if paid for foregone liquidity and for risk. The separation of saver and investor is much less prevalent in farming than in the urban, industrial economy. The savings of nonfarmers are certainly a potential source of farm capital. Furthermore, during the life cycle of the farm family, the period of highest capital needs coincides with the period of highest consumption needs and lowest income. Conversely, as savings accumulate over the period of active farming, the possibilities for profitable use of increasing capital diminish.

Existence of uncommitted savings within or outside the farming segment, however, does not automatically guarantee its availability to the farm operator. Apart from the question of the comparative marginal net productivities of capital in farm and nonfarm use, which is beyond the scope of this analysis, there is the vital question of the route that attracted savings must travel to get to agriculture. The saver and farm investor could negotiate directly; yet the relative isolation of the farm operator from the mass of potential lenders certainly reduces the availability of savings to the farmer as compared with the urban entrepreneur. Of course, this is the purpose of financial institutions — banks, insurance companies, and finance corporations.

Until recently, institutional credit sources have tended to be urban

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<sup>9</sup> Agricultural Statistics, 1951, USDA, Washington, D. C., p. 599; Statistical Abstract of the United States, 1953, U. S. Dept. of Commerce, Washington, D. C., p. 290.

in location, ownership, and outlook. Even farm savings not invested directly, such as those of older farmers, must be channeled to other farm users via these same urban businesses. Furthermore, the rapid emergence of the mutual fund and industry-wide retirement program may well tend to carry savings even farther from agriculturally-oriented institutions. The availability of either farm or nonfarm savings to supply the future capital needs of agriculture is restricted to the extent that the credit institutions are (1) not readily accessible in location, (2) unfamiliar with the individual farmer's enterprises and organization, (3) unduly fearful of farming risks, or (4) unwilling to arrange loan terms suited to the needs of farming.<sup>10</sup>

The investment effort and the farmer. Capital is not formed until savings are transformed into productive goods. This third phase of the capital formation process raises another question pertinent to agriculture: Will the farmer seek out and invest all of the credit that might be profitably used in combination with his labor and management?

The saver prefers to keep his funds in a safe but liquid form, unless he can get a return commensurable to the degree of nonliquidity and risk coincident with lending. However, the payment required to satisfy this desire does not appear to be very high for normal investment outlets. For the borrower to be able to appropriate the savings with some given cost, there must be (1) knowledge about the role and use of credit in an enterprise economy, (2) understanding of the production process to be used in employing the additional capital, (3) possibility of enhancing net productivity enough by the use of borrowed capital to cover its cost, the risk, and a minimum desired margin of added income (affected by effective demand for a product), and (4) willingness to accept the uncertainty and any stigma attached to indebtedness. Only when these conditions of lender and borrower are fulfilled will capital be formed.

Aside from the question of the marginal value productivity of capital in farming today — overshadowed by inelastic product demand, underemployed labor, inflated factor costs, and other issues beyond the scope of this analysis — a relevant concern is the adequacy of farmers' knowledge and necessary credit decisions for actual capital formation in agriculture. This important problem is discussed further in Chapters 15, 16, 20, 21, and 23. To the extent that farmers do not consider credit to be a satisfactory tool of production, that their knowledge of credit sources and use is deficient, and that their beliefs about indebtedness, risk-bearing, and good management are incompatible with credit expansion, farm capital formation can certainly be thwarted. Even farmers' beliefs about the merit of education and personal enlightenment can affect the expenditures made to better the educational opportunities for their children (cf. Chapters 4 and 22). The credit and capital problems in agriculture may well be shortcomings in farmer demand rather than deficiency in credit supply.

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<sup>10</sup>H. G. Diesslin, "Effect of urban and industrial development on agricultural finance," *Jour. Farm Econ.*, Vol. 40, Dec., 1958, p. 1149.



Research, technology, and inheritance. Capital formation generally follows the trail-blazing path of research and new technology. Since consumers derive less satisfaction from additional units of given goods and services, a prerequisite of any continued increase in production and capital formation is the creation of new goods and services. Furthermore, since demand for the farmer's product is highly inelastic both price- and income-wise, more inputs are hardly needed except for population growth. Thus, a substantial portion of new farm capital resulting from research and technology is substituted for labor. Capital formation in agriculture will be allied closely with the withdrawal of a plentiful labor supply to other uses.

A final consideration important to the capital formation process in agriculture relates to two characteristics of an enterprise system. Whatever levels of capital accumulation are achieved by the previously explored process tend to be perpetuated by the inheritance process. No generation begins at the same point; in fact, inheritance looms large as the dominant source of farm capital. Such perpetuation of capital levels also affects further capital formation. An enterprise system tends to return value for productivity not only to the human factor, labor and management, but also to capital goods. Hence, a farmer's total income is enhanced somewhat in proportion to the extent of his inherited capital, thereby further bolstering savings out of which new capital can be formed. Divergent capital holdings among farmers may well become fixed, if not further magnified, over time.

## SOURCES OF CAPITAL AND ITS FORMATION IN AGRICULTURE

Capital formation in agriculture can be examined in two ways, each with merit, namely: (1) the aggregate capital structure of all farms; and (2) the capital formation process for the individual farmer.

### Aggregate Farm Capital Formation

Probably the most complete research undertaken on this subject was recently completed by A. S. Tostlebe for the National Bureau of Economic Research. The data contained in this publication will serve as an empirical basis for the discussion that follows.<sup>11</sup>

The data in Table 2.1 indicate the magnitude of total farm capital used over the years. The total farm capital in 1950 — measured by physical assets of land, buildings, implements and machinery, livestock and poultry, and crop inventories — reached the impressive value of \$107 billion.

Effects of inflation. A substantial proportion of the increase over

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<sup>11</sup> Alvin S. Tostlebe, *Capital Formation in Agriculture: Its Formation and Financing Since 1870*, Princeton University Press, Princeton, N. J., 1957.

the years is attributable to the changing price level, most specifically to the highly inflationary forces since 1940. During the period of 1910-14 to 1950, \$53.7 billion of the current value of farm assets, or exactly one-half, were added by the inflated price level alone (Table 2.1).

Table 2.1. Total Value of Physical Farm Assets, United States, Census Years 1870-1950 (billions of dollars)<sup>a</sup>

	1870	1880	1890	1900	1910	1920	1925	1930	1935	1940	1945	1950
Prevailing prices	11.9	13.4	17.5	21.8	43.3	83.8	60.7	60.5	40.4	43.9	75.0	107.4
Constant prices (1910-1914)	19.8	27.8	33.7	40.3	45.4	49.8	48.0	49.2	47.2	48.6	51.4	53.7

Source: A. S. Tostlebe, *Capital Formation in Agriculture: Its Formation and Financing Since 1870*, Princeton University Press, Princeton, N. J., 1957, pp. 54, 66.

<sup>a</sup>Physical assets include land, buildings, implements and machinery, livestock and poultry, crop inventories.

In aggregate terms, it could be concluded that inflation is a means by which agriculture can acquire its capital base since the price index of farm land — as one important indicator of farm asset value — increased more over the above 40-year period than the general price level.<sup>12</sup> However, this gain can be somewhat illusory for the individual farmer, since the gains of one generation via inflation must be paid for by the next generation in higher initial cost. Perhaps some of the gain is retained by farmers in the inheritance process. Furthermore, farmers could gain through inflation if all their debts were incurred in periods of depressed prices and paid off in subsequent booms. Unfortunately, this does not seem to be the case. Substantial borrowing by farmers during the 1900 to 1920 period had to be repaid during the depressions of the 1920's and 1930's, or was liquidated through foreclosure resulting in capital loss to the individual.<sup>13</sup> An appreciable amount of the borrowing during the late 1930 to early 1940 period worked to the advantage of farmers as a result of inflation after World War II.

Land grants a source. What was the source of the real capital (1910-14 prices) base of \$53.7 billion held by farmers in 1950? One important source of this farm capital was the acquisition of large portions of the public domain via homesteading, "squatters' rights," special grants, and purchase directly or indirectly from grantors at low prices.

Approximately 13 percent of the total land area of the United States, or 21 percent of the land in farms (in 1954), was homesteaded subsequent to 1870.<sup>14</sup> Hence, the total farm physical assets in 1900 (valued at \$40.3

<sup>12</sup> Historical Statistics of the U. S., 1789-1945, GPO, Washington, D. C., 1949, p. 231; Economic Report of the President Transmitted to the Congress, January 1960, GPO, Washington, D. C., 1960, p. 196; The Farm Real Estate Market, USDA, Oct., 1959, p. 28.

<sup>13</sup> Tostlebe, *op. cit.*, pp. 136-39.

<sup>14</sup> B. H. Hibbard, *A History of the Public Land Policies*, The Macmillan Co., New York, pp. 396-402; Agricultural Statistics, 1956, USDA, Washington, D. C., 1957, p. 426.

billion, 1910-14 prices) were largely the result of the productive effort of the entire economy in acquiring the public domain, and of the effort of the pioneering generations in wresting the resources from their native state and former users.

Savings from gross income. This still leaves unexplained the \$13.4 billion increase in real farm capital from 1900 to 1950. Aggregate data indicate that the major portion of this farm capital was derived directly from savings out of prevailing net farm income. The role of farmer personal savings as a source of capital becomes even more convincing when gross capital formation over the entire 1870-1950 period is examined. Not only was there a \$33.9 billion increase in real farm capital during these 80 years (1910-14 prices), but at least an estimated additional \$57.7 billion of capital went into depreciation for farm buildings and machinery. Of this combined gross capital formation, an estimated seven-eighths came from the farmers' own gross savings, while one-eighth came from credit.

Limitations in the aggregate data analyzed here could result in an underestimation of the importance of certain phases of the farm capital formation process. These data represent net changes in the capital goods category between census periods. Capital uses or transfers completed within a year, or even between census periods, may not be evident in the data; certainly these are substantial. Furthermore, credit may be used and repaid within the census period without being included in the compilations of credit use.

It is of increasing importance that farmers are using more supplies and services — largely of nonfarm origin — within a production period or portion thereof, e.g., fuel, insecticides, insurance, electricity, fertilizer. Such items are not included in the aggregate capital data as physical assets, yet they are capital used to further the production of farmer labor and management.<sup>15</sup>

Changing composition of farm capital. Although net capital is still being added in farming, the rate of growth has declined considerably. Only \$8 billion accrued to the real value of physical farm assets (1910-14 prices) in the 40-year period from 1910 to 1950, while over three times that amount was added in the previous 40-year period. However, changes in the relative importance of various types of physical assets have characterized this century (Table 2.2).

The dominant shifts in the farm capital structure are the increasing importance of implements, machinery, and other livestock relative to land, buildings, and workstock. Shifts in composition of farm capital vary by region, as is indicated for the Appalachian and Corn Belt regions in Table 2.2. The relative shift toward implements and machinery is

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<sup>15</sup>Tostlebe refers to these as "intermediate products" rather than capital, *ibid.*, Chap. 7. However, Leftwick suggests, "Specific examples [of capital] are buildings, machinery, land, available mineral resources, raw materials, semi-finished material, business inventories, and any other nonhuman tangible items used in the productive process." R. H. Leftwick, *The Price System and Resource Allocation*, Rinehart & Company, Inc., New York, 1955, pp. 4-5.



Table 2.2. Percentage That Various Types of Farm Capital Are of Total Physical Assets, by Current Prices, 1870-1950, United States and Selected Regions

Physical Assets	1870	1880	1890	1900	1910	1920	1925	1930	1935	1940	1945	1950
(Percent)												
United States: <sup>a</sup>												
Land and buildings	78.1	76.3	76.0	76.3	80.4	79.1	81.5	79.1	81.4	76.6	72.8	70.1
Implements and mach.	2.8	3.0	2.8	3.5	2.9	4.3	4.4	5.5	5.3	7.0	8.3	12.0
Livestock and poultry	13.8	13.5	15.3	13.8	11.3	10.1	8.3	10.7	8.6	11.7	11.9	12.0
Horses and mules	5.3	5.3	7.3	4.3	6.1	3.3	2.6	2.3	3.5	2.9	1.3	.5
Other	8.5	8.2	8.0	9.5	5.2	6.8	5.7	8.4	5.1	8.8	10.6	11.5
Crop inventories	5.3	7.2	5.9	6.4	5.4	6.5	5.8	4.7	4.7	4.7	7.0	5.9
Appalachian: <sup>a</sup>												
Land and buildings	76.7	77.4	76.7	76.9	77.1	76.2	80.7	79.4	79.8	78.8	73.3	72.0
Implements and mach.	2.3	2.6	2.5	3.3	2.9	3.8	3.9	4.2	3.9	4.9	7.0	11.6
Livestock and poultry	14.5	12.4	14.0	12.1	12.6	10.7	7.6	9.8	9.5	10.7	10.3	10.0
Horses and mules	6.9	5.9	7.6	5.3	7.9	4.8	3.4	3.3	5.0	4.8	3.2	1.3
Other	7.6	6.5	6.4	6.8	4.7	5.9	4.2	6.5	4.5	5.9	7.1	8.7
Crop inventories	6.5	7.6	6.8	7.7	7.4	9.3	7.8	6.6	6.8	5.6	9.4	6.4
Corn Belt: <sup>b</sup>												
Land and buildings	79.7	77.5	77.4	79.3	83.4	82.8	83.5	80.1	80.9	76.8	72.1	69.2
Implements and mach.	2.7	2.8	2.5	2.6	2.2	3.6	3.5	4.6	4.7	6.3	7.8	11.1
Livestock and poultry	12.5	12.3	14.4	11.8	10.1	7.8	7.3	10.1	8.2	10.3	11.5	11.4
Horses and mules	5.0	4.9	7.2	3.6	5.5	2.2	1.9	2.1	3.2	2.1	.7	.2
Other	7.5	7.4	7.2	8.2	4.6	5.6	5.4	8.0	5.0	8.2	10.8	11.2
Crop inventories	5.1	7.4	5.7	6.3	4.3	5.8	5.7	5.2	6.2	6.6	8.6	8.3

Source: Tostlebe, *op. cit.*, pp. 54-55.<sup>a</sup> Appalachian region includes: Tennessee, Kentucky, North Carolina, Virginia, West Virginia, Maryland, Delaware.<sup>b</sup> Corn Belt Region includes: Iowa, Missouri, Illinois, Indiana, Ohio.

slightly greater in the Appalachian region than in the Corn Belt region, even though there is greater underemployment of labor in the southern area. Could the desire for machinery as "consumption" goods (prestige), and could the vulnerability of the less educated Appalachian farmer to sales promotion be channeling available capital into implements and machinery faster than its net productivity warrants? The shifts in livestock capital are also of interest. In spite of the trend in the Appalachian region toward more livestock enterprises, the data strongly suggest that such a change has not been as rapid as that taking place in other regions.

Other changes associated with capital growth. Dramatic changes in agriculture have taken place in farm labor and farm product output simultaneously with the building of the farm capital structure. During the 1870 to 1910 period while the growth rate of physical farm assets was high, units of farm labor and farm output also increased rapidly. Subsequently, different forces seemed to take hold. Major physical capital growth was in machinery and implements which were substituted for both workstock and farm labor. As a result, capital per farm worker increased rapidly, farm labor declined steadily, and output increased with population growth and technological innovations.

During the period of 1910 to 1950, giant strides were made in farm output per farm worker and per unit of capital. The century of technology and knowledge was truly launched. Phenomenal results would be achieved from the use of new capital supplies almost equally suited to



substitute for land, livestock, or labor.<sup>16</sup> Yet steady increases in farm output are hardly due to mere physical capital, for the increments added have been small. Output has become the offspring of an endless expansion of knowledge — an invaluable capital addition to agriculture in the form of better-informed management and labor, improved technology of production, and costly but profitable urban-produced supplies for every phase of the production process.

Considerable support could be mustered for the conclusion that in aggregate terms agriculture has all the capital goods it will need in the foreseeable future. The capital additions that will be needed in real estate improvement, machinery, and urban-produced supplies will not change the totals very much. A highly inelastic product and dynamic technology set the perimeters. As long as low earnings exist for many factors already in farm production, the theory of capital formation does not suggest that vast streams of the economy's savings will rush to the agricultural sector to seek the reward of high marginal returns.<sup>17</sup>

### Sources of Capital for the Individual Farmer

Capital only partial answer. How can the seeming contradiction be reconciled, i.e., adequate capital goods in the aggregate, need for much more capital by the individual farmer, and low returns on farm capital? The answer to improved farm income does not lie with a greater use of capital in existing patterns. Rather, it depends (to the extent that it is a capital problem) upon a capital base being used by management capable of higher productivities and in large enough combinations to return a desirable income in the presence of low average returns. An integral need is a reduction in the number of and an increase in the capacity of farm workers. Considerations other than capital, such as power in the market place, healthy economy, agricultural public policy, etc., are crucial to farm income improvement.

Contrasts at the aggregate and farm levels. The aggregate structure of farm capital may appear quite stable, while the ownership and use of such capital is constantly changing hands. It is at the individual farmer level where disparity of management and capital formation exists and is often perpetuated over the generations. This is where institutional barriers of belief, culture, knowledge, agency policy, and farm operation can hamper adequate capital growth. Furthermore, a farmer may find it profitable to use additional capital to expand production in a particular enterprise, e.g. strawberries, while similar action by a large group could result in loss of capital to all. Or a farmer may find local credit sources able and willing to finance a livestock enterprise, while similar action by many farmers could quickly exhaust the local capital supply.

<sup>16</sup>V. W. Ruttan, "Agricultural and nonagricultural growth in output per unit of input," *Jour. Farm Econ.*, Vol. 39, Dec., 1955, pp. 1573-76.

<sup>17</sup>Farmer-owned capital had an estimated rate of return of only 3.2 percent in 1959, lowest in 25 years. The Farm Real Estate Market, USDA, Washington, D. C., Feb., 1960, p. 23.

These contrasts at the individual and aggregate levels reflect major obstacles unique to the farmer. Not only are the laborer, manager, and capital owner different decision-makers in the urban corporate organization, but the identity of ownership of particular capital goods remains obscure — so obscure that ownership can be transferred and inherited without having any effect upon the use of the capital. Also, as an exception to the process of capital formation, the corporation secures much of its capital by withholding income for reinvestment before it becomes available for possible consumption as earnings to individuals. Conversely, the farmer is usually the embodiment of all three — labor, management, and capital — without preparation for the decisions demanded or opportunity to reconcile conflicts among the roles. The primary qualification of most farm youths for farming is experience as laborers on family or neighboring farms. Their fitness for management is given little consideration, and their readiness for the role of capitalist is ignored.<sup>18</sup> In the best of traditions, the burden of financial decisions have been reserved for the head of the household, who may expect little help from public education.

Although there are shortcomings, the decisions of individual farmers in an enterprise economy result in capital formation in agriculture. Farm capital is not formed in the aggregate. Individually, many farmers will need substantially increased amounts of all types of capital to close the income gap (cf. Chapters 1 and 14). The dominant capital problem is how the individual farm operator can secure these increasing amounts of capital, large already, on the average, as is evident in Table 2.3. Part III is primarily concerned with this problem. The problem may involve mainly a redistribution of a stable aggregate farm capital base among operators and owners quite different from those now controlling it.

Sources of capital. Capital formation at the farm level can be best understood by a brief examination of the primary sources of capital. These are: (1) inheritance, marriage, and gifts, (2) purchase of capital with personal savings, (3) borrowing capital goods (renting), and (4) borrowing purchasing power for capital goods (credit).

1. Inheritance, marriage, and gifts do not even register as any one of the sources of capital at the aggregate level, but at the individual farmer level these are probably the most important means of capital acquisition, as indicated in Chapter 9.<sup>19</sup> Inheritance is a vehicle designed only to transfer ownership from one generation to the next. Since it is not designed for any particular objective of capital use, its utility in meeting farmers' capital needs depends upon how it is used. Thus, the degree to which the following conditions are met can determine

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<sup>18</sup>L. A. Jones, "Financial management for farm people," *Agricultural Finance Review*, USDA, Washington, D. C., Vol. 18, Nov., 1955, pp. 1-9; What Young Farm Families Should Know About Credit, USDA, Farmers' Bul. No. 2135, Washington, D. C., June, 1959.

<sup>19</sup>Can You Own Your Farm?, NCR Publ. No. 14, Ky. Agr. Exp. Sta. Circ. 65, Nov., 1949; Becoming a Farm Owner, Publ. No. 17 of the Southeast Land Tenure Committee, Va. Agr. Exp. Sta. Bul. 473, June, 1955.

Table 2.3. Capital, Financial, and Income Data Per Farm and Per Farm Worker, United States, 1958

	Per Farm	Per Farm Worker
	(Dollars)	
Capital		
Physical assets		
Real estate (land and buildings)	24,500	15,500
Nonreal estate		
Livestock and poultry	3,000	1,900
Machinery and motor vehicles	3,700	2,300
Crops stored on and off farms	1,600	1,000
Production goods and services <sup>a</sup>	3,800	2,400
Financial assets		
Deposits and currency	2,000	1,300
U. S. savings bonds	1,100	700
Investments in cooperatives	800	500
Household furnishings and equipment	2,700	1,700
Liabilities		
Real estate debt	2,200	1,400
Nonreal estate and others	2,000	1,300
Proprietors' equities	35,000	22,100
Gross farm income	8,300	5,300
Net income of farm population from farming	3,400	2,100

Source: Balance Sheet of Agriculture, 1959, USDA, Agr. Info. Bul. No. 214, Washington, D. C., Oct., 1959, p. 6; Farm Income Situation, USDA, Washington, D. C., July, 1959, pp. 40, 41, 47, 48, 54.

<sup>a</sup> Primarily of nonfarm origin.

how well the inheritance process will contribute to capital formation for the individual farmers:<sup>20</sup>

- Inheritance received when heir is ready to commence farming, not at middle age while in midst of alternative career.
- Inheritance transferred in usable form, such as a farm or full line of machinery rather than an isolated tract of land or three-bottom plow.
- Inheritance available as a "going concern" with highest possible value as capital. That is, an operating dairy is more valuable than the sum of individual components, or land in use is more valuable than abandoned land.
- Inheritance involving the securing of expectations for both heir and predecessor so decisions of both can be more rational.
- Inheritance arranged so predecessor's actions are viewed as fair and helpful, and yet provides for his old age without burdening others.

<sup>20</sup>Relevant research results on this problem are found in K. H. Parsons and E. D. Waples, Keeping the Farm in the Family, Wis. Agr. Exp. Sta. Bul. 157, Sept., 1945.



Incorporation of estates should be explored as one way of meeting these conditions. For those farmers fortunate enough to inherit capital under these desirable conditions, no better source can be found. However, for many farmers, one or all of the other three sources must be used. The choice should be related to his income level, the amount of his accumulated capital, his managerial ability, and his physical well-being and interest.

2. Savings were found at the aggregate level to be the most important current source in real gross farm capital formation. Savings are also a vital source for the individual farmer with enough income to support capital formation. The process of primary interest here is that of savings prior to purchase of the capital goods, rather than subsequent to the purchase as in credit use.

Savings become farm capital through three important processes. First, a substantial portion of gross capital formation in agriculture takes the form of buildings and machinery depreciation, production supplies, livestock replacement, and increases in values of livestock and given real estate. These capital inroads into gross income are so vital and normal to the ongoing farm operation that they usually take precedence over consumption. Second, the burden on every farmer to secure his own capital often calls for the use of production credit. This necessitates a type of forced saving to protect his livelihood, in which debt repayment may well get priority over consumption. Third, the entire purchase price of a capital good may be saved before the acquisition is made.

On the other hand, caution should be exercised in placing a heavy burden upon savings as the source of capital for the individual farmer. A low net income leaves little margin, after depreciation and consumption needs are met, for the volume of savings needed. The gross capital formation and increase in financial reserves at prevailing prices exhibited by agriculture from 1900 to 1950 — originating largely with savings — averaged only an estimated \$300 per farm per year.<sup>21</sup> At even twice that rate of saving, though half the investment were inherited, 27 years would be required for a farmer to accumulate just the average amount of physical assets used per farm in 1958 (Table 2.3).

Just as profitable farming demands more capital, so the farm family is increasingly expecting a higher level of consumption (living) as the level of living of the nation rises. These same needs and desires continue to raise the cost of rearing farm children. It is indeed questionable whether the agricultural ladder process, firmly anchored in savings as the source of farm capital, is a meaningful alternative for future agriculture.<sup>22</sup> The role of savings can best provide for a gradual expansion of capital once an income earning base of farm capital has been obtained elsewhere.

<sup>21</sup>Capital formation, financial reserves, and number of farms from Tostlebe, *op. cit.*, pp. 50, 138. The rate of savings during the favorable 1945 to 1950 period was an estimated \$800 per farm per year.

<sup>22</sup>Kanel, D., *et al.*, "Getting started in farming is hard," Land, The 1958 Yearbook of Agriculture, USDA, Washington, D. C., pp. 254-62.



Borrowing capital goods (renting). The third source of capital for the individual farmer, one not exposed by aggregate data, is borrowing the capital goods directly, or renting. Renting can take various forms — whole-farm share and cash arrangements, leasing of land units adjacent to owned land, custom use of capital goods, and certain contracts with vertical integration, as in livestock and poultry.<sup>23</sup>

Trend data on tenancy may conceal more than it reveals. To be sure, the trend generally has exhibited a reduced percentage of rented farms partly due to less share-cropping and to recovery from the agricultural depressions of the 1920's and 1930's. Upon closer scrutiny, however, renting is found as a stable or increasing system of farming in the commercial Corn Belt. Furthermore, in 1954, 34 percent of the farm land in the United States was operated as rented capital, most of it being leased by nearby owners.<sup>24</sup> Renting is probably second only to inheritance in importance as a source of capital to the individual farmer (cf. discussions by Raup in Chapter 9). In many lands the social, political, and economic revolutions call for the abolition of renting as an institution, e.g. Japan and India; yet renting has become a firmly established means of providing farm capital in some of the more stable, developed countries, e.g. England.<sup>25</sup>

Renting is a satisfactory source of capital only for certain farmers under particular conditions. If adequate capital can be acquired through inheritance, savings, or credit, assuming the role of a renter has little merit. However, farmers who are unable to obtain adequate capital through these means, but who have potentially sound managerial ability, may find renting an attractive source of capital. The adequacy of renting will further depend upon whether the operator is able to secure dependable, legally sound, and enduring rental arrangements, and whether he is willing to assume the somewhat unstable and socially less acceptable tenure status.<sup>26</sup> Upon meeting these conditions, farmers have a good chance of acquiring more capital and achieving higher net returns by renting than they would via credit. A further difference, without definite merit, is the expectation that the renter will share with the capital owner both windfall gains and losses. In the absence of perpetual indebtedness for the major physical farm assets, renting may assume an increasingly important role as a source of capital for the individual farmer. The argument for perpetual indebtedness is advanced in Chapters 1, 13, 15, and 17.

Borrowing purchasing power for capital (credit). The final major source of capital for the individual farmer is the borrowing of purchasing

<sup>23</sup>A. B. Mackie and E. L. Baum, "Programs for commercial farmers with low incomes," *Problems and Policies of American Agriculture*, Iowa State University Press, Ames, Iowa, 1959, pp. 417-22; R. C. Engberg, "Credit implications of integration in agriculture," *Jour. Farm Econ.*, Vol. 40, Dec., 1959, pp. 1370-79.

<sup>24</sup>Land, *op. cit.*, p. 563; *Agricultural Statistics, 1956*, USDA, Washington, D. C., p. 426.

<sup>25</sup>K. H. Parsons, R. J. Penn, P. M. Raup, eds., *Land Tenure*, University of Wisconsin Press, Madison, Wis., 1956.

<sup>26</sup>R. G. F. Spitze and Gregorio Alfaro, "Property rights, tenancy laws of Cuba, and economic power of renters," *Land Econ.*, Vol. 35, Aug., 1959, pp. 277-83.

power, or credit. The extent of credit use, measured by the ratio of total farm debt to value of physical assets, has risen and was approximately the same in 1959 as in 1910; however, it was twice as high in 1930.<sup>27</sup> Credit will assume a larger role according to the extent to which farmers seriously attempt to obtain capital needed to raise their incomes, and as the three other major sources of capital prove insufficient.

Credit has unique functions to perform in the farm capital formation process. Gross income can probably provide the capital for depreciation and much of the gradual accretion needed in physical farm assets, with the possible exception of machinery and buildings. Yet other functions remain for credit if the individual farmer is to have adequate capital. Ownership of existing farm capital, particularly the land resources, must be recombined under fewer operators. Furthermore, as long as owner-operatorship is the desired form of tenure, all farm capital must be transferred to new operators each generation.<sup>28</sup> As incorporation is used more by farmers as a versatile financial arrangement to assist in acquiring capital, bearing risk, and facilitating inheritance, credit becomes a more useful vehicle. Savings of both farm and nonfarm origin can be tapped through credit. Finally, credit is well suited to assist the farmer in obtaining the nonfarm capital goods increasingly needed as supplies for profitable production.

Credit, however, is not a satisfactory nor possible source of capital for all farmers. Even more than in renting, managerial ability is a prerequisite for satisfactory use of credit. Whereas in some rental arrangements managerial assistance is provided by the owner or supplier of the contract, the lender generally does not offer similar help. Furthermore, a borrower must have considerable owned capital if he is to obtain credit for an adequate unit. When a farmer with little equity attempts to use credit to meet all his capital needs, he may be burdened with a low-producing farm, high interest rates, and unfavorable terms. Finally, adequate credit use is rooted in adequate knowledge and beliefs.<sup>29</sup>

Credit sources are varied as to organization and operation, both of which are subjects of subsequent discussions. Generally, farmers have access to noncooperative private, cooperative private, and public sources of credit. Furthermore, most of these sources are being improved by new policies and programs. Two of these are: (1) revised procedures of the cooperative farm credit agencies to meet some of the many farmer needs, e.g., the initiation by the Production Credit Association of the

<sup>27</sup>Estimated at 13 percent for January 1, 1960, with one-half the debt being real estate and one-half being nonreal estate. 1960 Agricultural Finance Outlook, USDA, Washington, D. C., Nov., 1959, p. 5.

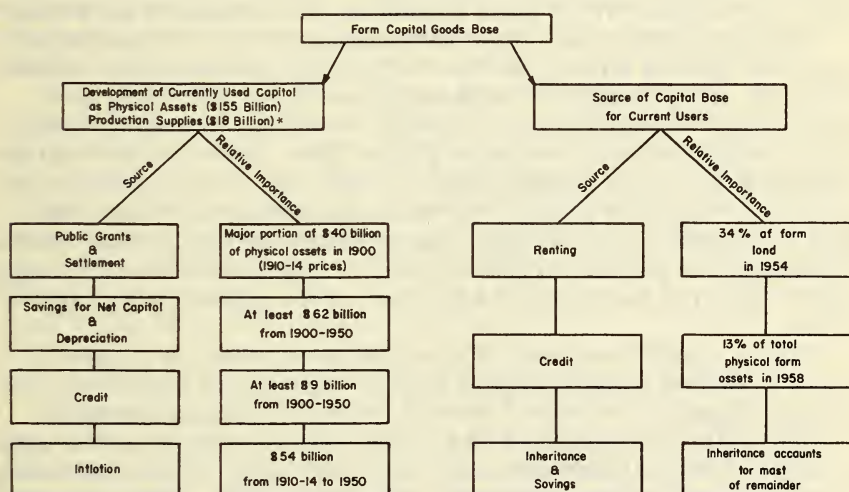
<sup>28</sup>Joseph Ackerman and Marshall Harris, *Family Farm Policy*, University of Chicago Press, Chicago, Ill., 1947, pp. 15-28.

<sup>29</sup>W. E. Hendrix, *Approaches to Income Improvement in Agriculture*, Prod. Res. Rpt. No. 33, ARS, USDA, Washington, D. C., Aug., 1959; W. H. Nicholls, "Southern tradition and regional economic progress," *Southern Econ. Jour.*, Vol. 26, Jan., 1960, pp. 187-98.

five-year intermediate-term loan; and (2) expanded use of the agricultural representative by commercial banks serving rural areas, resulting in apparent benefits to both farmer and banker.<sup>30</sup> This needed change is discussed by Duggan in Part I, and others in Part III. The latter program can help overcome disadvantages to farmers associated with the urban nature of financial institutions. In view of rapidly increasing capital needs per farm worker and the longer terms of many of the capital commitments, incorporation, continuous renting, and perpetual indebtedness deserve further consideration for facilitating the capitalization process.

Savings, renting, and credit have been explored as sources of capital for farmers not fortunate enough to inherit a sufficient amount (see Figure 2.1 for summary). Yet none of these sources are relevant for a vast group of low-income farmers, namely, the aged, disabled, disinherited, and those possessing little potential managerial ability. The odds are convincing that these farmers cannot secure and use capital adequately to net them a desired income. However, this hardly implies the absence of a problem. The solutions would seem to rest not with obtaining farm capital, but with subsistence grants, improved educational opportunities, or migration assistance as discussed in Part IV.

<sup>30</sup> R. G. F. Spitze and R. J. Bevins, The Agricultural Representative Program in Commercial Banks of Tennessee, Tenn., Agr. Exp. Sta. Bul. 289, Aug., 1958.



\*Taken from data for 1958 used in Table 2.3. Depreciation involved during the years of development does not, of course, show up in these cumulative data.

Fig. 2.1. General summary of capital formation process in agriculture (estimated from data in previous discussion).



## Discussion

C. E. BISHOP\*

Spitze's definition of capital revolves around the concept of abstinence. This requires him to be concerned with differences between "maintenance" and "consumption." Spitze concluded, after some discussion of the concept of capital, that capital is produced goods and services saved from consumption and used by or as a part of the human agent in further production. In view of his rejection of the tripartite classification of factors of production, could he not define capital as a valuable input that has duration? This view of capital allows the inclusion of public and semi-public sources as well as private sources. Furthermore, it makes no distinction between land and other "factors of production." Rather, the distinction is based upon durability and nondurability of assets.

In his discussion of the savings process and capital formation, Spitze emphasizes the fact that farmers have held values with regard to the allocation of income to savings and consumption different from those that have characterized much of the rest of society. This difference, however, is being reduced over time, and farmers now spend their income in approximately the same manner as other groups in our society.

Spitze emphasizes the role of knowledge as a factor influencing both supply and demand forces. He does not give due consideration, however, to the role of knowledge and the development of new technology as a form of public investment in agriculture. However, he does call attention to the giant strides in farm output per farm worker and per unit of capital that took place between 1910 and 1950, and the extremely large increase in output (24 percent) that occurred between 1950 and 1958 while total inputs were constant. The fact that total inputs were constant emphasizes our inability to place a value on management as such. Managerial capital is not considered as a part of the capital input in agriculture.

A more explicit treatment of resource development as a factor in capital formation would have been helpful. Only in this way can we tie the static aspects of resource use into concepts of capital formation.

Spitze calls our attention to the importance of working out new ways of "redistributing a relatively stable aggregate farm capital base among operators and owners quite different as individuals from those now controlling the capital base." He properly attacks our system which requires each generation of farmers to start from the beginning and accumulate the capital necessary to operate a profitable business. He contrasts the urban and farm situations in this regard. The question at

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hand, however, pertains not to urban and rural locations, but to the structural organization of agriculture in comparison with the structural organization of nonfarm firms. The difference is primarily one of the importance of individual proprietorship as a form of business.

Spitze raises the question of whether farm families should continue to have to rely upon savings as a source of capital for agricultural adjustment as they adopt more of the consumption patterns of urban people. This really raises the question of whether owner-operated farms can be organized in such a way as to generate sufficient income to provide equal levels of living for farm and nonfarm people and at the same time permit the farmer to pay off principal on his debts. This is one of the most difficult problems facing American agriculture.

In Chapter 2 Spitze indicated that renting and credit are satisfactory sources of capital only for certain farmers under particular conditions. The conditions developed by him, however, are not sufficient to serve as guides in resource-use decisions. This problem area certainly warrants a great deal more time and thought by economists.

#### GLENN E. HEITZ\*

Spitze suggests that the capital problems of agriculture may well be rooted more in inadequate demand than inadequate supply. He attributes inadequate demand to lack of understanding by farmers in this matter of financial management. In a 1952 study, the Farm Credit Administration found that management, not credit restriction, was the greatest limiting factor in progressive use of credit for farm improvements.

What can be done to help improve the inadequate demand, or lack of understanding, in financial management? Agricultural lenders themselves should, in many cases, assume more of this responsibility. The agricultural colleges should devote more time and effort to this subject in their teaching, extension, and research departments. Our colleges have done much to help farmers grow many blades of grass where only one grew previously, but have done far too little in this matter of farm financial management. Some money and manpower in our colleges devoted to this job should pay big dividends in service to farmers. Also, there should be closer coordination of agricultural lenders, colleges, and agricultural leaders in this over-all educational program.

Certainly the farmer's views on credit should receive adequate consideration. A few years ago I asked a group of predominantly commercial farmers what they considered deserving farmers have a right to expect of credit. They agreed that "deserving" means the ability to borrow and repay with interest and be in a better financial position after having done so. Those farmers listed the following characteristics that deserving farmers can rightly expect of credit:

1. An understanding, permanent, and dependable source of credit.

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2. A credit plan that fits the farm plan in terms of (a) providing the right amount of money at the right time, with a minimum of time, trouble, and expense; (b) providing for repayments when products are marketed; and (c) interest charged on the actual number of dollars used and for the exact number of days the money is used (cf. Chapters 11, 13, 15, and 16).
3. Credit that will permit farming according to sound farm management practices rather than according to the limited cash on hand.

Progressive and farsighted agricultural lenders, such as the banks and associations that comprise the Farm Credit System, know that farmers have such credit needs and are constantly reshaping their programs to meet these needs (cf. Tootell's discussion in Chapter 17).

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## *Structure of the Capital Market and an Evaluation of Its Components*

THE EFFECTIVENESS of capital markets in serving agriculture will be evaluated in this chapter. This evaluation is made by directing attention to all of the capital used in or by agriculture, regardless of the specific form in which the capital happens to be momentarily. Thus, capital in the form of people and technology is just as important, for the purpose at hand, as capital in the form of land, buildings, and other items. This broad view of resource allocation as a capital problem is needed if, for example, gaps in the markets for capital are to be analyzed—a matter of more significance than determining how well the individual capital markets do what they are designed to do. The allocation of capital among alternative uses is the focal point of interest in evaluating the capital markets.†

The thesis of the author is that existing capital markets have not been, and are not effective in providing an adequate amount or an efficient use of capital in agriculture. This statement implies that we face the challenge of being creative, i.e., creative enough, and imaginative enough, to develop means, consistent with the goals of a free and progressive society, that will bring forth a reasonably adequate demand for, supply of, and allocation of capital to agriculture and the rest of the economy. This challenge falls into three interdependent parts. These parts concern the supply of capital in the aggregate; the efficiency of existing suppliers of capital; and the closing of gaps in existing capital markets.

### DIMENSIONS OF CAPITAL NEEDS OF AGRICULTURE

The dimensions of the capital needs of agriculture are explored by asking: When and how much capital is employed in agriculture? The

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†It is hoped that the context in which the word capital and related terms are used will convey the meaning intended. It has been an interesting experiment to write this chapter on the assumption that an evaluation of the capital markets can best be made by treating credit problems as inseparable from capital problems, and by treating capital problems as a matter of the allocation of all resources. Thus, the appropriate yardstick to be used in evaluating the capital markets serving agriculture is the efficiency of the allocation of capital in agriculture.



first place to look for part of the answer to this question is in the Balance Sheet of Agriculture.<sup>1</sup> This source indicates that the total assets of agriculture on January 1, 1959, amounted to \$203.1 billion, divided as follows:

	<u>Billions</u>
Real estate	\$125.1
Livestock	18.1
Machinery and motor vehicles	18.4
Crops	9.4
Household furnishings and equipment	13.1
Deposits and currency	10.0
U. S. savings bonds	5.2
Investments in cooperatives	<u>3.8</u>
Total	\$203.1

What other capital is used in agriculture that is not accounted for in the Balance Sheet of Agriculture? An outside observer would find, upon careful examination, that many of the people working on farms are not listed on the Balance Sheet of Agriculture. However, after his initial surprise, this observer would find that these people, at least some of them, are entered on another sheet of paper called the Income Statement for Agriculture. On this statement he finds two entries, one with reference to farm operators, and the second labeled "wages to hired labor." After considerable effort to determine what, if anything, these people are worth, he comes to the conclusion that they must be worth more than the items listed in the Balance Sheet of Agriculture.

A close examination indicates that many roads, school buildings, dams, electrical facilities, etc., were not included in the Balance Sheet of Agriculture. Further examination reveals that a great deal of activity seems to be centered on bringing farmers various things that they use to produce food and fiber. In addition, there are other people who market the food and fiber produced by farmers. Little of the capital used in these activities is accounted for on the Balance Sheet of Agriculture. Thus, a balance sheet for agriculture, coming anything close to accounting for all the capital used, would not only need to count the items included in the Balance Sheet of Agriculture, but also the people, community, and marketing facilities. Martin, Mackie, Woodworth, and Fanning examine the human aspects and their environment in evaluating capital use and investment in agriculture in Chapters 4, 22, and 23.

A last item which might bother the outside observer is how to count the technological knowledge employed in food and fiber production since it has no value explicitly imputed to it. After careful consideration this, too, would be counted because people were willing to spend money to get new technology, and thus, it must be worth something,

<sup>1</sup> Balance Sheet of Agriculture, Agr. Info. Bul. 214, USDA, ARS, 1959.



even though it raises a question of double counting on the distribution side.<sup>2</sup> The dimensions of capital used in agriculture are so defined.

### SOURCES AND DETERMINANTS OF THE SUPPLY OF CAPITAL USED IN AGRICULTURE

The capital employed in agriculture is examined with reference to sources, and the determinants of supply.

#### Sources of Capital

The sources of capital employed in agriculture will be examined in terms of: (1) capital accounted for in the Balance Sheet of Agriculture, (2) capital invested in people, and (3) all other capital embodied in items such as roads, technology, etc.

Balance Sheet of Agriculture. On January 1, 1959, the liabilities of agriculture amounted to \$23.3 billion, while proprietors' equities were listed at \$179.8 billion for a total of \$203.1 billion. The liabilities were composed of \$11.3 billion in real estate debt, \$2.5 billion Commodity Credit Corporation loans and guarantees, and \$9.5 billion of short-term debt. An examination of proprietors' equity on the asset side indicates that \$45.6 billion worth of real estate was rented, \$17.3 billion from other farm operators, and \$28.3 billion from nonfarm operators. Thus, the amounts of capital identified as to source were as follows:

	<u>Billions</u>
Real estate debt	\$11.3
Commodity Credit Corporation debt	2.5
Other reporting institutions debt	5.8
Non-reporting creditors	3.7
Real estate rentals	<u>45.6</u>
Total	\$68.9

The rental of capital in other forms is also found in agriculture. If these rentals amounted to 10 percent<sup>3</sup> of the value of livestock, machinery, and stored crops (excluding crops with CCC loans), an additional \$4.6 billion of capital moved to farm operators through the capital markets. Thus a total of some \$73.5 billion of capital, on January 1, 1959, was borrowed or rented by farm operators. This amounted to 36 percent of the total assets listed in the Balance Sheet of Agriculture.<sup>4</sup>

<sup>2</sup> This capital need is normally not considered in analyses of this type because thinking is restricted to the confines of distribution theory. This is a mistake. Value and growth theory is also relevant in this context.

<sup>3</sup> An estimate based on a Great Plains study. Balance Sheet of Agriculture, p. 12.

<sup>4</sup> Some double counting is involved because landlords are not necessarily debt free.

Analysis of the allocation of this borrowed capital indicates that 45.5 percent of all real estate capital was borrowed, while 28.1 percent of all other capital, excluding financial assets, was borrowed.<sup>5</sup>

Capital invested in farm people. No attempt will be made to put an exact price on the heads of the agricultural population for several reasons, not the least being the problem of choice of method — cost of production; cost of replacement; earnings, discounted after maintenance and depreciation, in agriculture; possible earnings outside agriculture; and the like. It is clear that some 5 million farm families are involved and that the capital so invested in these people exceeds the amount accounted for in the Balance Sheet of Agriculture. Capital for investment in people comes largely from household income and government tax expenditures, through the provision of such services as education, health, and welfare. Martin presents data on these types of investments in Chapter 4.

Other capital invested in agriculture. Significant amounts of capital are used in agriculture for the development of new technology, community facilities, and the marketing of farmers' products and supplies. The capital used to support these activities comes from various sources. Support for the development of new technology is largely provided by government and the suppliers of inputs sold to farmers. Both private and public funds are used in financing community facilities. In these cases, most of the capital is supplied out of income, earnings, or taxes, though the credit and financial markets are sometimes the immediate sources of supply. In the case of firms engaged in the marketing of agricultural products or supplies, the sources of capital are similar to those generally available to businesses in other parts of the economy.

### Determinants of Capital Supply

The supply of capital available for agriculture is examined with reference to the total supply of capital for the entire economy and in relation to the share of this capital that can be directed to agricultural uses.

Aggregate supply of capital. The determinants of the total amount of capital that a society is willing to hold, and of the increments it is willing to add to these holdings each year, are complex. A list of these determinants would include such items as income — including the total amount, changes, and its distribution; the structure of institutions; customs, the values of the people; interest rates. The major variable among these determinants in the short run is the interest rate or the price that people will be paid for the use of capital.

Little information is available regarding the price elasticity of

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<sup>5</sup> The 28.1 percent figure would be reduced had the \$19 billion of financial assets been included and the \$2.5 billion of CCC loans and assets been excluded. CCC loans are more nearly sales of commodities than regular indebtedness in the usual meaning of the term.

supply of savings in the aggregate.<sup>6</sup> Two general types of information which bear upon this question are available. One type concerns the relationship between income and savings, while the other centers upon the differences in the behavior of people where the returns for use of savings differ. Both types of data suggest that the short run price elasticity of supply for savings is very low. The logic of this conclusion is fairly simple.

When income and its distribution and changes therein are related to savings and changes therein, significant relationships are observed. Thus, to the extent capital accumulation can be explained in terms other than the interest rate, the interest rate cannot be the explanatory variable. An examination of cross-sectional data shows that farmers and small businessmen save significantly higher percentages of (about double) their incomes than do other people of comparable ages in comparable income groups. These farmers and businessmen are also the people who have opportunities for obtaining the highest marginal yields on capital. Many farm operators can obtain marginal yields on capital of 50 to 100 percent per year. This same situation may well exist for many businessmen. For example, Schweiger reports that small manufacturing corporations in 1957 earned, on the average, at least 16 percent on net worth after taxes plus, probably, several percentage points accruing from understated earnings. He also indicated that the average return to capital "...tends to be much lower than the return possible on marginal capital."<sup>7</sup> It can also be observed that small businessmen and farmers often fail to take advantage of cash discounts at an interest cost of usually 24 to 36 percent per year. Thus, if marginal yields on capital amount to between 25 and 100 percent and the percentages of income saved by people with these opportunities are double for these groups (unincorporated businessmen, 17 percent) compared with all urban units (12 percent) in the same income group (\$7,500 to \$10,000),<sup>8</sup> and the yield on savings for the latter group is in the 3 to 5 percent range, fairly low price supply elasticities are suggested.<sup>9</sup> Thus the capital markets appear to have little, if any, effect on the total supply of capital in the short run.

In the long run the situation may well be very different. The establishment of new credit institutions and of other enterprises, such as life insurance companies, may significantly affect the total supply of capital available to a society.

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<sup>6</sup> The concern here is with real savings, not with measures that result in encouraging the use of, for example, idle cash balances. This does have an impact on real saving through increasing prices or inducing other action to restrain prices, or through changes in the level of employment.

<sup>7</sup> Irving Schweiger, "Adequacy of small business financing: another view," *Financing Small Business, Part I*, Vol. I, Background Studies, Federal Reserve System, 1958.

<sup>8</sup> Figures in problem taken from Schweiger article drawn from the 1950 B. L. S. Wharton study.

<sup>9</sup> These figures are at best only suggestive in that the same person will often have a savings account with a 3 or 4 percent return and yet borrow money on, for example, a car at perhaps 36 percent.



Share of capital available to agriculture. The supplies of credit available to agriculture from some lenders appear to be unlimited at going interest rates if the quality requirements of the lenders are met. There appears to be a general agreement on this point in Part III. Over time the supplies of credit also appear to be infinitely elastic, though interest rates, along with quality requirements, change. These changes appear to occur in step with the changes experienced by other borrowers. Thus the credit markets appear to be extremely effective and efficient in obtaining credit for farm operators from both local and national sources. This view is also held by Baughman and Wetmore in Chapter 12 and Engberg in Chapter 16. This evaluation should not be interpreted to mean that existing interest rates, quality standards, etc., do or do not make economic sense, but that, given the policies and traditions of lenders and the legal restraints under which they operate, they are highly efficient in obtaining credit for agriculture.

The noncredit capital markets for agriculture, largely concerned with rental agreements, are much more difficult to evaluate than are the credit markets. However, these markets seem to be fairly efficient in the specialized areas in which they operate. On the other hand, equity capital obviously is not available to agriculture in the forms that can frequently be obtained by nonagricultural firms.

## THE SUPPLIERS OF CAPITAL TO AGRICULTURE

An evaluation of the effectiveness of the capital markets is made by focusing attention upon those institutions which supply capital to agriculture through credit and other means. Questions concerning these suppliers are centered upon the magnitude of their activity, their sources of capital, the parts of the capital market served, lending policies and practices, and the efficiency of their operations with respect to the costs of lending and the needs of borrowers.

### The Suppliers of Credit

The relatively minor role that suppliers of credit play in supplying agriculture with capital is suggested by the data in Table 3.1. These figures, of course, tend to exaggerate the relative roles of these lenders since the Balance Sheet of Agriculture accounts for only a small percentage of the capital used in agriculture.

These suppliers of credit obtain the capital they provide to agriculture from different sources. The groups classed as individuals and others, and as commercial and savings banks, obtain their funds largely from local sources, while the Farmers Home Administration and the Commodity Credit Corporation obtain their funds largely from the Federal treasury in amounts determined by Congress. The Federal Land Banks and the Production Credit Associations obtain their funds



Table 3.1. Nature of Agricultural Credit Extension by Lenders

Type of lender	Percentage of all debt outstanding held by various lenders		Amount of debt outstanding held by various lenders as percentage of assets used in agriculture and accounted for on the Balance Sheet of Agriculture
	Farm mortgage debt	Nonreal estate debt	
Federal Land Banks	18.1	--	1.0
Farmers Home Administration	3.2	4.5	.4
Life insurance companies	24.5	--	1.4
Commercial and savings banks <sup>a</sup>	13.5	41.6 <sup>b</sup>	2.9
Individuals and others	40.7	36.0 <sup>c</sup>	4.2
PCA's and FICB's <sup>a</sup>	--	9.8	.5
Commodity Credit Corp., loans held	--	8.1	.4
Total	100.0	100.0	10.8

Source: Agricultural Finance Review, ARS, FERD, Washington, D. C., Vol. 21, July, 1959, pp. 121, 134, 135, 145. (Percentages calculated by author.)

<sup>a</sup>Including CCC loan guarantees.

<sup>b</sup>All operating banks.

<sup>c</sup>Nonreporting creditors.

from national capital markets. The life insurance companies obtain their funds as a by-product of the sale of insurance. These latter agencies — the Federal Land Banks (FLB's), Production Credit Associations (PCA's), and the life insurance companies — as far as farmers are concerned, are able to provide unlimited amounts of credit. In other words, the supply of credit may be treated as infinitely elastic from the point of view of borrowers, as long as the lenders' quality standards are met. The rationing of funds by these agencies is on a quality basis, almost exclusively, rather than on a price basis. The supply of credit provided by banks and individuals cannot normally be thought of as infinitely elastic; therefore, it is rationed on both a price and quality basis.

**Federal Land Banks.** The portion of the market the Federal Land Banks stand ready to serve is, and traditionally has been, restricted to high-quality real estate mortgages. Their quality standards have been such that their loss rates have been negligible on loans made since the Great Depression. Loss rates for the period of 1917 through 1940 never exceeded 1 percent of outstandings and have averaged about one-half of one percent of outstandings (Table 3.2). Loss rates since 1940 have been lower than those in the earlier period.

A further indication of the quality of Land Bank loans can be gained by an examination of the loss experience of the Federal Farm Mortgage Corporation. Many second mortgages were made on Federal Land Bank first mortgages as well as first mortgages involving more risk than the Land Banks were permitted to take. Losses of the Federal Farm Mortgage Corporation on cumulative outstandings amounted to only 0.42 percent for the 1933-40 period, and 0.57 percent for the

Table 3.2. Federal Land Bank Loss Rates, 1917-1940

Year	Cumulative losses to end of year as a percentage of cumulated year-end outstandings <sup>a</sup>	Annual losses as a percentage of year-end outstandings
	(Percent)	
1929	0.13 <sup>b</sup>	0.42
1930	0.16	0.40
1931	0.21	0.60
1932	0.27	0.95
1933	0.29	0.52
1934	0.29	0.26
1935	0.84	0.70
1936	0.38	0.73
1937	0.41	0.76
1938	0.46	0.93
1939	0.49	0.94
1940	0.51	0.80

Source: R. J. Saulnier, Harold G. Halcrow, and Neil H. Jacoby, *Federal Lending and Loan Insurance*, Princeton University Press, Princeton, N. J., 1958.

<sup>a</sup> Losses also include: throughout, charge-offs of principal and interest on mortgage loans; from 1935 through 1937, net increases in valuation reserves maintained against farms owned outright or in process of acquirement; and from 1938 on, net increases in valuation reserves covering both loans and real estate transactions. Losses are given net of recoveries from national farm loan associations resulting from their endorsement of loans.

<sup>b</sup> From year of organization, 1917.

1941-51 period. Another measure of the high quality of Land Bank loans is suggested by their appraisal and lending policies. Since the Great Depression their lending policies have been tied to appraisals based on normal agricultural value. In terms of the current purchase prices of the properties, it has been unusual for the farmer to close a loan with less than a 50 percent equity. Thus, the Land Banks have restricted their lending to the low-risk portion of the market.

The cost of borrowing from the Land Banks in terms of interest and service charges, not necessarily income foregone by the borrower through a restriction on the amount borrowed, has been less than for most other lenders. The second form of leadership shown by the Land Banks is in the length of loan. Land Bank loans have traditionally been for much longer periods than those of any other lenders with the exception of certain subsidized loans of the Farmers Home Administration. The efficiency with which the Land Banks have performed their job, in terms of costs per dollar loaned or outstanding, leaves little to be desired. In fact, their long-term record has been improved in recent years.

Life insurance companies. The segment of the market served by the life insurance companies more nearly overlaps that of the Land

Banks than is the case with any other lenders. The major differences between the two are that the life insurance companies restrict their lending to the less risky types of agriculture, usually on a geographical basis; require less equity on the part of borrowers; charge interest rates slightly higher than the Land Banks; make loans of a larger average size and for shorter periods. They, too, have had negligible loss rates on loans made since the Great Depression. The loss record of the life insurance companies was higher than that of the Federal Land Banks during the 1920's. This resulted, in a large measure, from the fact that they made a sizable number of mortgages on the basis of World War I prices and expectations. The Land Banks were just getting organized during this period, and consequently had lower losses than otherwise would have been the case.

Insurance companies have been highly efficient in providing agriculture with credit. The service charges are reasonable by any standard applied. In fact, the farm mortgage departments of life insurance companies usually return a net yield somewhat less than the departments making home mortgages.

Production Credit Associations and Federal Intermediate Credit Banks. The market served by the PCA's and the FICB's overlaps that served by commercial and savings banks in the nonreal estate market. Loans by the PCA's can be for periods up to five years, though in general the terms are much shorter. The PCA's grant loans that are significantly larger on the average than comparable bank loans.<sup>10</sup>

The quality of PCA loans has been high. Their loss rates have been favorable as compared with the losses of national banks and country national banks.<sup>11</sup> (Table 3.3). These data suggest that the PCA's serve the well-established farmers, though these data alone are not inconsistent with other conclusions. No detailed data are presented on the lending costs of the PCA's, though their record of efficiency is also outstanding.

Bank lending. Loans to agriculture by the banking system involve the extension of both real estate and production credit. Many serve the real estate market in a double role. They originate mortgages which are later sold to insurance companies and others. They also grant mortgages which they hold in their own accounts. In the nonreal estate credit markets, the banks' outstanding loans amount to over 40 percent of the market; thus, they serve several times as much of the market as the PCA's and FICB's. There is little reason to believe that the operating costs of these lenders are out of line and that they are anything other than highly efficient in both their real estate and nonreal estate lending activities.

Commodity Credit Corporation and Farmers Home Administration. These government agencies provide special credit services to agriculture. The credit operations of the CCC are a by-product of the

<sup>10</sup> Saulnier *et al.*, *op. cit.*, Table 34. (See Table 3.2, this volume.)

<sup>11</sup> *Ibid.*, Table 38.



Table 3.3. Comparative Loss Rates of All National Banks, Country National Banks, and Production Credit Associations, 1936-1950

Year	Total losses of all national banks <sup>a</sup>	Net losses of country national banks <sup>b</sup>	Net losses of PCA's <sup>c</sup>
	(Percent)		
1936	1.87	1.37	0.68
1937	0.82	0.48	0.28
1938	0.95	0.42	0.88
1939	0.74	0.33	0.46
1940	0.58	0.31	0.22
1941	0.44	0.16	0.14
1942	0.42	0.05	0.12
1943	0.43	0.15	0.12
1944	0.36	0.22	0.06
1945	0.21	0.19	0.03
1946	0.26	0.12	0.06
1947	0.34	0.06	0.10
1948	0.21	0.10	0.11
1949	--	0.18	0.22
1950	--	0.09	0.08

Source: Saulnier *et al.*, *op. cit.*, Table 38. (See Table 3.2, this volume.)

<sup>a</sup> Calendar-year losses (before deduction for recoveries) as percentage of December 31 outstanding.

<sup>b</sup> For 1936 and 1937 fiscal-year losses as percentage of June 30 outstandings; thereafter, refers to calendar-year losses and December 31 outstandings. Except for 1936 and 1937 (when banks in 14 to 21 cities with less than three banks are included), the data are restricted to national banks other than those in reserve or central reserve cities.

<sup>c</sup> Actual plus estimated net losses for calendar year as percentage of average of month-end balances, with the 1949 and 1950 losses of taxable PCA's adjusted for the "general provision for undetermined losses."

government price-support program. The nonrecourse loans and loan guarantees of the CCC are in general more in the nature of income than of borrowing. The FHA operates several credit programs, none of which are directly competitive with programs of other lenders. These programs were originally intended to be a means of filling one of the capital "gaps" in agriculture — that of providing credit to farmers who could not get credit elsewhere to establish reasonably efficient farming units. Borrowers were also provided with farm management services of a nature private lenders normally do not, and likely cannot, provide. Woodworth and Fanning, Hopkin, Engberg, Diesslin, Tootell, and Shepardson indicate in following chapters that such services are now being offered by private lenders, and the great need for expanding this assistance is prudent business and offers remunerative returns.

The programs of the Farmers Home Administration have tended to shift in purpose, becoming similar to regular credit operations and losing their original purpose of aiding in the development of efficient farm firms. Murray presents a different viewpoint in Chapter 11.



FHA losses have varied widely among the various FHA programs. However, its record for low losses and low operating costs is impressive to even the most economy-minded persons when recognition is taken of the nature of the programs that were implemented.

Individuals and others. Individuals and others supply 4.2 percent of the capital, accounted for in the Balance Sheet of Agriculture, used by farmers. This amounts to almost 41 percent of all real estate credit and 36 percent of all nonreal estate credit.

The sectors of the market that individuals and others serve include low equity real estate loans and the financing of equipment, feed, and other items. No adequate picture is available, for the entire country, of how these credit suppliers fit into the capital markets serving agriculture.

All suppliers of credit. An evaluation of the performance of the groups supplying credit to agriculture reveals that they provide about 11 percent of the total capital used in agriculture accounted for in the Balance Sheet of Agriculture. These groups effectively and efficiently serve the sectors of the market they try to serve. On the other hand, most lenders simply are not equipped to provide capital to agriculture on terms required to achieve an optimum allocation of capital. They often leave unserved such capital needs that cannot be adequately secured in terms of marketable assets. Thus, from the point of view of an optimum allocation of capital, there is little likelihood of a situation being realized where the costs of credit will come close to equaling the marginal returns from the use of credit.

### Other Suppliers of Capital

The noncredit sources of capital used in agriculture can be largely traced directly to (1) various types of rental arrangements and (2) retained earnings along with gifts, inheritances, and capital gains. Capital originating from these sources passes through and is influenced by the capital markets in varying degrees. The major question posed is: How effective are the capital markets in bringing about an optimum use of the capital originating directly from these two sources?

Capital provided through rental agreements. The rental markets for agricultural land and other inputs are generally local and of great variety. Raup deals with this subject in greater detail in Chapter 9. The connections among these markets are indirect and exist through the national credit markets serving agriculture and the investment alternatives open to the people owning and renting these inputs. The capital provided to farm operators through rental agreements presumably must meet capital needs that are qualitatively different from the needs met by the national institutional lenders since their supplies of credit are infinitely elastic.

An evaluation of the efficiency of rental contracts involves many considerations, though two seem to be of major importance, viz.,

(1) a farm operator is usually able to obtain more capital through rental agreements than in any other way, and (2) the difficulty of designing a rental agreement for the parties involved to share production costs and outputs in ratios that will lead to farm firms organized with maximum efficiency. The efficiency with which capital is allocated through the rental markets can in part be evaluated by inference, subsequent to noting several trends.

Since the pressure for increases in the size of farms is great, the renting of farms could be expected to increase. However, this has not occurred. Thus it appears that the disadvantages of renting must have outweighed the potential efficiency. Moreover, even if the decrease in farm tenancy occurred as a direct result of relatively high farm incomes during and following World War II, the fact remains that most farms are less than the optimum size.

Capital provided through retained earnings. Most of the capital used in agriculture has been acquired from the earnings of farmers, including capital gains, along with inheritances and gifts. Spitze presented data on this subject in Chapter 2. A complete analysis of how efficiently these assets are used would need to include a consideration of both household and firm problems. At one extreme the position is taken by some that since people use their capital in the way they do by their own free choice, an optimum use of the capital, all things considered, must exist. While this view has its own logic, it ignores the existence of imperfect knowledge, markets, and the like, and further assumes away the resource allocation and equity problems flowing from accidents of birth, luck, etc. This situation does not exclude the possibility or the desirability of changes in capital markets or other institutions that will lead to a more efficient allocation of capital without any loss of freedom by farmers to do just as they please with their capital. This opportunity is an important part of the over-all challenge.

## ADEQUACY OF THE CAPITAL MARKETS FOR AGRICULTURE

The capital needs of agriculture are examined from the standpoint of (1) the needs of individual farm firms; (2) the need for investment in people; (3) the needs of firms marketing agricultural products and supplies; (4) community needs; (5) the need for accumulating capital in the form of new technology; and (6) the needs of the agricultural industry as a whole.

### Individual Farm Firm Needs

Numerous studies indicate that most farms in the United States — both commercial and low-income — are of less than the optimum size and/or are out of balance with respect to their capital-labor ratios. Thus, most farm operators are underemployed, secondary to

(1) unrealized economies of scale and/or (2) a shortage of capital relative to labor, a matter of variable proportions.<sup>12</sup> In cases where underemployment of labor is secondary to unrealized economies of scale, other inputs are also underemployed.

Elimination of underemployment of the first type requires more inputs of all types in individual firms, while correction of the second type of underemployment requires more capital or less labor in the farm firm.<sup>13</sup> These problems have not been solved through the efficient operation of the capital markets. Moreover, existing capital markets likely offer little hope of meeting these problems — a conclusion suggested by the long period over which these underemployment problems have existed, and reinforced by new technology being developed for use in agriculture (cf. Chapters 14, 22, and 23). Thus it is concluded that existing capital markets have failed to come close to bringing about agricultural firms that either are of optimum size or that use the proper proportions of various inputs.<sup>14</sup>

### Capital Needs for Investment in People

The amounts of capital needed for investment in people will vary depending on the tests of need applied. If people in agriculture are considered as only economic inputs with no mobility, and thus no alternative use, then the amount of capital invested in them is excessive. It is also likely true that agriculture would be more efficient if the existing capital in people were concentrated in a smaller number of people. By this measure of need, more resources are being devoted to the health, education, etc., of rural people than is justified.

If the assumption of immobility is relaxed, an inadequate amount of capital would seem to be invested in rural people. However, it would be economical to make additional capital investments in only those people who would be shifted to an alternative employment and in only the minimum amounts required to shift them. By this test of need, more capital should be invested by the local community in people in only those special cases where the marginal value product of rural people to the members of the community is negative; or by lenders only when it represents the most profitable investment alternative; or by the state or nation if a transfer of these rural people will contribute to the interests of the larger community by an amount greater than would any other investment of the required capital. Chapters 23 and 24 deal with this problem in greater detail.

<sup>12</sup> The third type of underemployment, secondary to an overexpanded industry, would exist in pure form if all agricultural firms were of optimum size, using inputs and producing outputs in optimum ratios.

<sup>13</sup> The logical alternative of reaching an optimum capital-labor ratio through a reduction in the amount of labor used in individual farms will seldom be appropriate because of the scale problem.

<sup>14</sup> Studies of the causal factors of why farmers use too little capital often reveal an unwillingness by farmers to use credit that is available. Thus, the problem is that of changing farmers' attitudes and/or changing the terms, etc., on which capital can be obtained.



If rural people are considered as more than economic inputs or as ends, in an equalitarian society, the appropriate test of need for capital investment in people is changed. By this test the usual welfare criteria apply, and there seems to be little doubt that more capital should be invested in rural and nonrural people.

Existing capital markets have not achieved adequate investment in people, nor do they appear likely to do so in the future. The reasons are several. First, people are "free" and cannot be bought, sold, or mortgaged as can other economic inputs. Thus the lenders of capital would have little security. This fact alone means the capital markets cannot operate effectively in this area. Since the usual capital markets cannot meet this need, most capital investment in people must come out of household income, either directly or indirectly, through taxation. This situation has not been brought about, nor does it seem likely to bring about, an adequate supply of capital for investment in people.

#### Agricultural Marketing Firm Needs

The conclusions regarding the effectiveness of the capital markets in bringing about an optimum use of capital in agricultural marketing are not as clear-cut as is the case with individual farm firms and people. Two facets of this question are of interest, viz., that which concerns the scale and variable proportions problems within marketing firms and that which concerns the number and capacity of such firms in the aggregate.

One evidence of an ineffective allocation of capital to agricultural marketing firms is the fact that farmers own sizable equities in agricultural marketing cooperatives. Since many individual farmers are inadequately supplied with capital and yet find it profitable to invest in marketing cooperatives, supplies of capital may be inadequate for this type of marketing firm. On the other hand, private marketing firms and individuals provide most of the inputs purchased by farmers and market most of the outputs produced by farmers. These firms, of great variety and size, have access to the same capital markets as other comparable businesses, which suggests no special problem in agriculture. This fact suggests that if a reconciliation is attempted, the capital markets serving nonagricultural industries will prove to be as inadequate in bringing about an optimum amount and use of capital as are the capital markets serving agriculture.

Little information is available for evaluating the extent to which capital markets have progressed in supplying adequate capital to all marketing firms serving agriculture. However, if these marketing firms were optimally organized, one would probably find that a more than adequate amount of capital has been allocated to this sector of economic activity. Thus, the problem, to the extent it exists, may well be an oversupply of capital to all such marketing firms in the aggregate but an undersupply to individual firms.



### Community Capital Needs

People engaged in farming, as well as others living in rural areas, place demands upon the supply of capital as members of a group distinct from their individual needs. These capital needs are classified into three types: (1) demands by local government; (2) demands for resource development, of types exemplified by some programs of the Department of the Interior and the Rural Electrification Administration; and (3) needs for the development of new industry in low-income agricultural areas. Sizable capital outlays are required for consumption, production, and capital accumulation to provide services to the members of a community.

Local government needs. Capital requirements are primarily for roads and education. Local outlays for education — capital investment in people — can be used to illustrate a part of the capital problem in agricultural communities. Investment in education tends to increase underemployment for two reasons. First, resources devoted to taxes will decrease the amount of resources available for use by farm firms, and second, at a later date the capital requirements of optimum-sized firms will increase secondary to a new generation of more able farm operators. This, however, is not the end of the story, since higher levels of education will tend to increase labor mobility, thus setting the stage for the movement of people from agricultural to nonagricultural employment. Underemployment of the third type (secondary to an oversized industry) will then be decreased.

The flow of capital into education is almost exclusively determined by the incomes of the members of the community, yet the yield from such investments is likely negative in its correlation with community income. Therefore, capital investments by community groups are not likely to be allocated among communities in anything close to an optimum pattern. Nor, given existing capital markets, does it seem likely any significant improvement can be made. As a whole, existing capital markets are unable to cope with this type of capital need. This conclusion is similar to Mackie's in Chapter 22.

Community resource development needs. These needs have been met historically by many blends of private and government activity. At one extreme is the direct government program where the funds have been provided by the federal government, e.g., the Rural Electrification Administration; at the other extreme are the private endeavors. Between these extremes are a great variety of programs involving differing amounts of public aid, such as land grants to the railroads, federal credit programs, and the like.

Any attempt to evaluate whether too much or too little capital has been directed into programs of these sorts would be a major undertaking. This is an area where the private capital markets can play an important role, especially when varying types of federal loan insurance and loan guarantees can be employed.

Capital needs for new industry. These needs reflect an opportunity

to increase efficiency by moving employment to people rather than by moving people to employment. That such opportunities are available is not a question of doubt. The real questions are how much, in what places, at what rates, and by what methods shall capital be invested in new industries. It is clear that the capital markets have not operated in the past to prevent the problem of bypassed low-income communities. The extent to which existing capital markets can meet this type of problem is not so clear. Perhaps the question of greatest interest centers on the measures that can be taken to make the capital markets more effective in bringing about an adequate total supply and distribution of capital to ameliorate this type of problem.

### Needs for New Technology

The capital devoted to the development of technology employed in agriculture is generally recognized as highly productive. In fact, the income woes of agriculture are now quite commonly ascribed to the high rate of technological development (cf. Chapters 6 and 7). This view is correct in a superficial way in that an absence of modern agricultural technology would increase the prices of agricultural commodities. In a meaningful economic sense this view is incorrect because it implicitly assumes no alternative use for other agricultural inputs.

The amount of capital allocated to the development of technology is either excessive or inadequate, depending on the yardsticks employed. It is excessive if we consider how primitive the technology of food production should be, assuming no outward mobility of inputs used in agriculture, if returns to people employed in agriculture are to be similar to that earned by others in nonagricultural employment. On the other hand, assuming perfect mobility of agricultural inputs, the flow of capital to the development of technology has been inadequate in the past. An adequate evaluation of the extent to which capital needs of agriculture for the development of new technology are being met requires, in addition to the usual costs and returns calculations, analysis of the costs of increasing input mobility, especially people. Such an analysis would indicate an inadequate accumulation of technological capital and an inadequate flow of capital for the development of new technology.

### Agricultural Industry Capital Needs

The total capital need of agriculture is examined with reference to two measures of capital need, viz., (1) capital requirements for the production of adequate supplies of food and fiber, and (2) the over-all problem of an efficient organization and structure for agriculture.

Capital needs for an adequate supply of food and fiber. Given the existing supply and demand for food and fiber, the amount of capital

used in agriculture is more than adequate. This is an implication (by definition) of existing agricultural surpluses, since a surplus in a meaningful economic sense can exist only when the allocation of resources is excessive in the sector of the economy under consideration.<sup>15</sup> To the extent that surpluses exist, the capital markets have not operated in a way to bring about an allocation of capital to agriculture in an optimum total amount.

Capital needs for an efficient agriculture. Assuming that changes were to be made so that the optimum number of firms would be in agriculture, that each firm would be of optimum size, and that each firm would employ inputs and produce outputs in optimum ratios, major changes would be required in the allocation of capital. These changes in capital allocation would require shifts within agriculture and between agriculture and the rest of the economy. The exact picture of an agriculture in equilibrium cannot be specified, nor is such an exact specification needed in this context. This much of the picture seems clear and useful for the purposes at hand: (1) fewer people would be employed in agriculture, though the amount of capital invested in each of these people would be increased; (2) most land would continue in use since its alternative uses are few; (3) improvements on land, except for the housing of farm people whose numbers would decrease, would likely increase; and (4) the use of capital in other inputs would increase. Thus, the major adjustment requirement within agriculture is that of increasing the average size of farms, while the major need between agriculture and the rest of the economy is a transfer of people out of agriculture.

Major gains in the efficiency with which capital is allocated requires, in addition to the movement of people out of agriculture, increased amounts of capital on terms not now available and for purposes not being met. The new terms must be such that potential marginal yields from the use of capital will serve as the major rationing principle rather than tests such as equity ratios. This problem is most likely as difficult to solve on the demand side as on the supply side of the market, as is evidenced by farmers' reluctance to borrow even when marginal yields are high. Methods must also be worked out so that more capital will be available in adequate amounts for such neglected purposes as investment in people, the development of new technology, resource development, etc.

When answers to this challenge are being sought, likely first places to look will include methods whereby (1) the total supply of capital can be made responsive to changes in demand, (2) gaps in the capital markets can be closed, and (3) greater efficiency can be achieved in the operations of individual suppliers of capital. This is a major challenge, probably one that cannot be met by existing capital markets.

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<sup>15</sup> This seems to be the level of sophistication at which people are thinking when they suggest fewer resources should be devoted to the development of new technology, that credit or education should be restricted, etc.



## Discussion

### IVY W. DUGGAN\*

In determining capital needs of agriculture, Brinegar includes not only the capital items in the Balance Sheet of Agriculture, but also adds capital embodied in people, community facilities (such as schools, roads, and dams), marketing facilities, technology, and certain activities centered in bringing farmers various items used to produce food and fiber. He carries these non-Balance Sheet items all the way through his discourse, which makes it difficult for this discussant to comment on them briefly and devote adequate time to the discussion of capital items in the Balance Sheet.

People reared and educated on the farm have required income that would have been used in other ways had they been reared and educated elsewhere. Investment in the numbers of people who have left the farm has drained capital away from agriculture. The cost of rearing and educating the children of workers in a textile mill is paid for from the income of the workers and is not capitalized in the mill capital. Also, to an increasing degree, many of the states are collecting more taxes for education from the general public and allocating the funds on a pupil — or similar — basis. The capital embodied in people is considered in greater detail in Chapter 22.

The assembling, transporting, warehousing, processing, and distribution of food and fiber are not generally performed by the farmer. Businesses carrying on these activities are important and require capital, but, with the exception of cooperatives, farmers generally have little, if any, capital invested in them. The same holds true for the businesses supplying farmers with inputs used in agricultural production.

The remainder of this discussion is confined to the structure of the capital market for agriculture as an industry and primarily the commercial farms in the industry. Also, pertinent remarks will be confined to only the items included in the Balance Sheet of Agriculture. The Balance Sheet of Agriculture includes the capital of part-time, low-income, and subsistence farmers. However, I would assume that the capital of the commercial farms represents a rather high percentage of the total capital accounted for in the Balance Sheet.

Sociologically, subsistence and part-time farmers and nonfarm rural people are important, but their hope of betterment is mostly outside of commercial agriculture, as indicated in Chapters 14 and 22. These people contribute little to the agricultural industry.

In the second paragraph, Brinegar states "...that existing capital markets have not been, and are not effective in providing an adequate

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amount for achieving an efficient use of capital in agriculture." It appears that capital markets have contributed to the sharp reduction of manpower on farms from 1910 to 1959. At the same time, total output has almost doubled. During this period, farms increased in acreage and intensity of cultivation, and there was a rapid increase in the use of mechanical power and machinery, fertilizer, and other purchased inputs. This subject is developed in Chapters 6 and 7. Capital allocation contributed to all of these changes. Of course, research, education, and technology made their contribution to the dynamic changes that took place.

Productive gains in agriculture compare most favorably with the most progressive industries in the country. Efficiency in agriculture has increased for a number of years at a rate in excess of 2 percent a year. While capital is important, it appears that Brinegar overemphasized the role of capital in bringing agriculture to optimum efficiency and in achieving optimum allocation of resources (including people) within agriculture.

I am not too concerned about the lack of "know-how" in marketing capital, and especially credit. If the profits are high and if the risks are not too great or even supposed not to be, suppliers of credit will find ways of marketing their services. When banks were ultraconservative, they wanted little of the consumer credit business or installment loan business. In the meantime finance businesses have grown up all over the country and some have become national in scope. Banks are competing intensely to put personal loans and installment loans on their books, as demonstrated by the ads in newspapers, on radio and television, and in mailed literature.

Banks formerly contended that such loans were too expensive to make and serve, and that they were too risky. They have found that installment loans are more profitable than some of their other business. If the profit is there, someone will learn how to get it and will take the risks involved.

Let us return to the question of the importance of capital allocation to and within agriculture. Capital is drawn by conditions in an industry; it does not make the conditions. Rate structure design for public utilities, tariff laws, tax laws, price supports in agriculture, and fair trade laws all affect anticipated income and profits, which in turn affect the amount of capital which will be made available.

Institutional lenders are extending to agriculture types of credit which they did not extend only a few years ago. Some may be indirect, as in the case of integration. Large amounts of credit are supplied to feed mills which, in turn, extend credit to broiler producers. Broiler production in Georgia increased from 500 thousand birds in 1935 to 303 million birds in 1959. The two most important factors contributing to this increase were the capital and management supplied by the integrator. Integration will probably continue to have even more effect on allocation of capital to and within agriculture. This subject is covered more fully in Chapter 8.

It appears that Production Credit Associations and other suppliers of short-term credit are giving more weight to earning prospects and less to security offered than they have in the past. However, there are some indications that commercial banks are not going as far as Production Credit Associations.

As Brinegar stated, most of the capital used in agriculture has been acquired from the earnings of farmers, including capital gains, along with inheritances and gifts. Farmers, as a group, are willing to save a larger portion of their earnings than other groups. It is likely that farmers will continue to acquire a rather large proportion of equity capital from retained earnings in the future.

It would seem that improving the allocation of short-term credit to commercial agriculture in order to meet future needs should not be too difficult, provided farmers can earn reasonable returns on their labor, management, and capital. Improving the allocation of long-term credit will probably be more difficult. One way that might be worthy of exploration would be to extend the length of mortgages or move in the direction of permanent farm-mortgage debt and smaller annual payments, as suggested by Diesslin in Chapter 13. Of course there are other ways.

Improving the allocation of equity capital may be even more difficult. Inflation, partly due to overallocation of capital to land, that has resulted in high land prices compared with returns on land; the over-expansion of the agricultural plant in relation to present effective demand; the accumulation of surpluses; the declining farm income; the large amount of operating funds required in farming today; the drain on capital by children leaving the farm; and the settlement of the estates of farmers are all problems that evidently are not easily solved. It is to be hoped that the land-grant colleges, the Farm Credit Administration, the insurance companies, and others will carry on much additional research regarding equity capital allocation to and within agriculture.

#### SIDNEY D. STANIFORTH\*

Brinegar's discourse deals with an evaluation of the structure of the capital market relative to our present and future needs. It starts with an inspiring challenge to be creative and imaginative in developing means of meeting our capital problems. It concludes by stating that the existing capital markets have not been effective in meeting these needs, but disappointingly turns to the "people with an interest in capital markets to carry leadership in meeting this challenge." This understates the responsibility and role of agricultural economics research in the land-grant colleges and the U. S. Department of Agriculture.

Chapter 3 is thorough and rigorous with respect to the framework within which it analyzes the sources, suppliers, and needs of capital in agriculture. By confining the analysis within the framework of long-run

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equilibrium and by retaining a relatively high degree of aggregation, however, Brinegar excludes many important operational questions. The conclusions about the role that credit can play in agricultural adjustment problems is, I think, significantly different as well.

Capital needs are measured against the requirements of a complete equilibrium adjustment in the long-run sense. In the long-run equilibrium sense, we can accept the conclusion that "the major adjustment requirement within agriculture is that of increasing the average size of farms, while the major need between agriculture and the rest of the economy is a transfer of people out of agriculture." If we shorten the time period to the life span of those people now engaged in farm production, however, I feel we would reach different conclusions as to what can be done. This problem is then approached from the starting point of the existing situation of resource availability and use in agriculture. From there one proceeds into a relatively large number of categories of farmers classified according to their potential opportunities.

We can expect a continued, if not more rapid, increase in the average size of farm within the so-called commercial sector of agriculture. But people can be expected to move out of agriculture primarily as young people are discouraged from entering farming, or we might say, by failing to replace the loss of operators through retirement and death. A secondary movement will occur, of course, as people currently employed in agriculture enter nonfarm employment, either directly or through part-time farming, but this opportunity is limited by the age and training of the farm people involved. Even if direct movement of underemployed people out of agriculture were not limited for these reasons, we could not expect to create the several million additional new jobs that would be necessary to employ all people who could be released from agriculture. In dealing with the adjustment problem, then, we need to recognize the fact that a large portion of the people who are now underemployed in agriculture are going to make changes within a rather restricted context. In some areas the low-income group is a very significant portion of the total farm population. The quantity of capital needed by this group is not large, but the manner in which it is made available is very important.

Looking at the problem from this point of view, the challenge is to create economic opportunity for people now underemployed in agriculture. To be consistent with the total requirements of adjustment, these opportunities must be considered in four general areas: developing economic-sized farm units, moving into completely nonfarm opportunities, transitional or partial movement to nonfarm opportunities through part-time farming, and what might be called a salvage or rehabilitation operation for those who are restricted from the first three. The role of credit in this approach to adjustment has been defined in the concept of development credit.

While the creation of economic opportunity is the defined essence of development credit, it usually involves some method of providing

management along with credit to assure the achievement of potential productivities and to permit loans to be based primarily on future productivities rather than on present equities. Both of these components are recognized by Brinegar, but are not brought effectively to bear on the role of credit in agricultural adjustment.

If this alternative standard of reference is used in evaluating the job being done by suppliers of credit, loss ratios, interest rates, and efficiency of internal administration become quite secondary measures of effectiveness. In fact, these measures in many cases have been kept to "high quality" standards through conservatism, which restricts economic opportunity. Many pioneers among commercial bankers and the Federal Land Banks tend to lend by conservative standards. The Production Credit Associations in some areas are also more reluctant to offer development credit even though they have a field staff to service such credit ventures. They have, instead, significantly expanded so-called high quality loans by picking up accounts receivable from farm supply businesses. On the other hand, the Farmers Home Administration and its predecessors, from the time of relief and rehabilitation loans of the 1930's through development and expansion loans of the 1940's to adjustment loans in 1959, have created superior economic opportunity for those whose security does not meet commercial standards. Their role in development credit certainly cannot be measured by their percentage share of the total credit market alone.

The pioneering venture of the Farmers Home Administration has shown that the idea of development credit can work. Lenders and agricultural economists should be equally concerned with methods of applying this valuable experience in developing a completely commercial service that will give all farmers the benefit of what has been learned. This is largely a matter of how to incorporate management assistance with credit in an effective working package. This problem is not a simple choice between the slow but sound method of farm management education, on the one hand, and the quick but less desirable method of contract farming, on the other. The subject is developed more fully in Chapters 11 and 23.

It is encouraging to see rental agreements treated as another source of agricultural credit in a broader context of resource acquisition, much as was done by the late Professor Hibbard in his work on credit and leasing. The conclusion that leasing or rental arrangements are not now serving as an effective means of resource acquisition is difficult to refute although the percentage of farms held by lease may bear little relationship to the function being performed by leasing in resource acquisition. The fact that leasing is discarded immediately as an effective means of resource acquisition characterizes a common restriction of effective opportunity arbitrarily imposed by the researcher. This, in fact, concedes that because leasing has not performed an effective function it will not do so. One of the major challenges in the field of resource acquisition and resource allocation lies in changing these institutions to enable them to serve the requirements of an economically adjusting agriculture.



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## *Changes in Capital Productivity and Over- All Capital Problems<sup>1</sup>*

**A**GRICULTURAL ECONOMISTS are in general agreement that the United States will not need the additional product resulting from increased efficiency in southern agriculture even by 1975.

Therefore, if we are concerned with efficiency of capital use and capital markets in the South, it must be because we are concerned with the low-income effects of nonoptimal use of capital or of nonoptimal functioning of the market for capital funds or capital forms.

The fourth edition of Samuelson's *Economics* defines capital goods as goods "produced by the economic system itself to be used as productive inputs for further production of consumption and other goods and services."<sup>2</sup> Embodied capital (the term capital goods is dropped because it implies tangible goods) is a productive input in the sense of adding to production in the process in which it is used. It yields its stock of services over a period of time, rather than within a given production period as some other productive inputs do. Thus, the two significant aspects of embodied capital are productivity and the time period over which the productivity effects are felt.

Among the concepts developed for understanding and analyzing the use of all productive inputs (including embodied capital) is marginal revenue productivity, or marginal value productivity. This is the (net) increment to income from using another unit of the input. In the case of land, it is the additional (net) income a farmer earns by using the last acre of a given quality in production.<sup>3</sup>

This concept is an important part of the production function. We take as the production function

$$Y = f(X_1, X_2, X_3 \dots X_n)$$

with the quantities in physical terms. The marginal physical return to

<sup>1</sup>Published with the approval of the Director, Arkansas Agricultural Experiment Station. The author is indebted to Lloyd D. Bender, James H. White, Calvin R. Berry, and Henry J. Meenen for constructive criticisms and suggestions.

<sup>2</sup>Paul A. Samuelson, *Economics — an Introductory Analysis*, 4th ed., McGraw-Hill Book Co., Inc., New York, 1958, p. 576. Also, see Spitz's treatment of the meaning of capital in Chapter 2.

<sup>3</sup>In agricultural economics, MVP is sometimes computed as additional net income to the farmer's owned factors.



the  $i$ th factor will be  $\frac{\delta Y}{\delta X_i}$  for the last unit of  $X_i$  used. If the incremental units of  $Y$  will bring a price of  $P_j$ , then the marginal revenue product of  $X_i$  is  $P_j \frac{\delta Y}{\delta X_i}$  at the appropriate values of  $X$  and  $Y$ .

Is the production function an average of what all farmers can do? The actual production functions on which evaluations of the capital and credit situation are based are likely to have considerable normative content. The function is usually either an estimate of what better farmers can do, or an intuitive, and perhaps subconscious, estimate by the researcher of what level of productive efficiency will result in some hoped-for return. Do we consider how many low-income farmers can in fact manage to achieve the input-output relations assumed, to say nothing of the other components of farm management? It is likely that the problem is assumed away when we assume normative input-output relations, or assume without question that the Extension Service can miraculously raise management abilities substantially. Considerable investment in these human resources will be necessary before they can achieve the assumed results. This point of view is in agreement with Mackie in Chapter 22 and Woodworth and Fanning in Chapter 23.

## PUBLIC CAPITAL

Economic productivity in the aggregate and for the individual is a function of personal (or intangible) capital as well as of material capital. National product during a given time period would seem to be a function of capital investment embodied in human beings, their number, as well as of investment in stocks of material capital goods, and of the supply of natural resources. Because of the importance of technology, even the stock of natural resources at any given time is a function of cumulative past investment in human resources.<sup>4</sup> If investment in humans is this important, why have economists neglected it? It has not been completely neglected. Students of economic development from Adam Smith to John Rae to Kenneth Galbraith have discussed this form of investment, but no one has succeeded in developing a precise mathematical model. No easily applied criteria have been developed for determining the optimum amounts of such investments, to say nothing of the allocation of optimum amounts among different claimants.

Another possible reason why human investment has not received as much attention in the United States is that it has only grown into such vital importance since 1900. That is to say, the level of investment was not far below optimum until after the beginning of the twentieth century (considering all known technology as of the point in time).<sup>5</sup> The

<sup>4</sup> Technically, natural materials were always on hand but either were not discovered or their value was not recognized until changes in technology took place.

<sup>5</sup> It is perhaps more accurate to say that even the increased rate of human capital formation in recent years was not large enough to provide for optimum combinations of factors.

present emphasis on trained manpower is illustrated by estimates of future manpower needs in terms of skill and training. Mackie documents this trend in Chapter 22.

There are other than economic reasons for making some of the more important types of investment in human resources. This is especially the case for investments in education and health. As long as other reasons led decision-makers to choose levels of investment that were reasonably near the optimum, there was no practical economic problem. Now that deviations from optimum seem to be large and significant, investment in the human resource has become a factor limiting the rate of economic growth.

Research shows that increases in the volume of inputs used in production (conventionally measured) do not account for a very large proportion of the growth in total output since about 1910. Among writers on the subject, there is considerable agreement that such intangible factors as education and training, health, research, and similar factors are responsible for a good deal of the unexplained growth in output.<sup>6</sup>

Two ways that investment in human resources affect economic growth are mentioned briefly. Economic growth is associated closely with the rate of development of technology; this in turn is a function of investment in education and research. The effectiveness of investment in research is reduced if investment in education is not adequate. The division of expenditures between basic and applied research needs also to be optimum in order to maximize the effect on economic growth of a given investment in human resources.

Economic growth is also closely linked to the rate of adoption of developed technology. This rate is certainly affected by investment in education. Both quantity and quality of educational investment would be among the determinants of adoption rates, and of course there are other factors. Basically, the problem with low-income farmers seems to be that of increasing their learning rate enough to enable them to cope with rapid flows of technical information (cf. Chapters 22 and 23).

Information is available on state differentials in levels of investment in human resources. Several kinds of state data on investments in human resources are presented in Table 4.1. These data indicate rather dramatically that investments in the human agent (particularly in youth) are quite low in the South Atlantic, East South Central, and to a slightly lesser degree in the West South Central states. Low levels of human investment are associated with high rates of rejection by Selective Service. Data on the percentages of income going to higher education and local schools show that most of the southeastern states are slightly above the national average and are well below the percentages of the leading states. From these and other data it is apparent that marginal productivity of public investment (particularly in the

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<sup>6</sup> For a full discussion of the role in productivity of human, social, and community capital; for tentative definitions; and for references on the subject, see Lee R. Martin, *The Use of Federal Credit for Human Capital Formation*, memorandum prepared for the Commission on Money and Credit, 1960, Chapter ii, Section C.

Table 4.1. Investments in Human Resources, by States

State	Current public expenditure per pupil in average daily attendance, 1958-59	Number of days attended per pupil enrolled, 1953-54	Ratio of 1953-54 total enroll- ment <sup>a</sup> to school age population, 1953	Ratio of total 1956 college enrollment to high school graduates, 1954	Per capita public ex- penditures for health and hospital, 1957	Percentage of total personal income going as public ex- penditure for higher educa- tion and local schools, 1957	Percentage of selective ser- vice registrants examined who failed the men- tal test, 1958
	(Dollars)				(Dollars)	(Percent)	(Percent)
Delaware	420	158	0.97	2.5	17	3.2	22
Maryland	366	164	0.95	3.0	20	3.5	24
District of Columbia	434	149	0.95	11.3	36	1.8	27
Virginia	245	160	0.89	2.0	14	3.9	32
West Virginia	225	157	0.88	1.5	9	3.9	26
North Carolina	220	162	0.89	1.6	13	4.8	35
South Carolina	215	152	0.87	1.8	14	5.5	58
Georgia	208	157	0.89	2.0	19	4.4	42
Florida	295	155	1.00	2.5	19	3.8	34
Alabama	164	154	0.89	1.6	11	4.1	43
Mississippi	181	143	0.91	1.9	11	4.9	46
Tennessee	205	156	0.89	2.2	15	4.1	31
Kentucky	205	149	0.87	2.2	10	3.6	33
Arkansas	201	149	0.86	1.3	10	4.4	38
Louisiana	330	159	0.92	2.7	16	5.2	44
Texas	308	152	0.87	3.0	11	4.5	20
Oklahoma	279	159	0.94	2.3	12	5.3	10
New Mexico	390	151	0.95	2.6	17	6.2	19
Colorado	355	149	1.01	3.3	17	5.0	9
Wyoming	435	145	1.03	1.8	25	5.7	6
Montana	373	162	0.94	1.8	13	5.2	4
Idaho	270	155	0.92	1.5	16	4.8	5



Utah	280	158	0.96	3.3	13	5.9	9
Nevada	410	144	1.18	1.8	31	3.8	15
Arizona	332	141	0.96	3.8	12	5.9	20
California	390	174	1.00	4.1	24	4.6	15
Oregon	413	157	0.97	2.5	16	5.2	4
Washington	375	155	0.99	2.5	23	4.7	5
Kansas	330	150	1.06	2.4	17	4.9	6
Nebraska	290	158	0.98	2.2	14	4.1	7
South Dakota	333	160	0.92	2.0	8	5.4	9
North Dakota	310	160	0.88	1.8	14	5.5	8
Minnesota	358	158	0.96	2.4	23	5.4	6
Iowa	346	159	1.01	1.9	14	4.9	4
Missouri	335	156	0.99	2.6	14	3.3	14
Illinois	410	164	0.97	2.7	18	3.2	16
Wisconsin	360	161	0.95	1.9	19	3.9	8
Michigan	376	167	0.98	2.8	24	4.7	12
Indiana	325	154	1.00	2.3	16	4.3	10
Ohio	330	160	0.99	2.4	15	3.5	11
Pennsylvania	370	165	0.96	2.0	15	3.2	13
New Jersey	463	160	1.02	2.0	19	3.1	20
New York	535	157	1.06	3.3	32	3.5	21
Connecticut	380	162	1.02	3.0	23	3.2	18
Rhode Island	380	155	0.99	4.0	18	2.9	17
Massachusetts	375	159	0.98	3.4	31	2.9	12
Vermont	305	160	0.89	2.8	15	4.7	13
New Hampshire	326	158	0.98	2.8	23	3.7	8
Maine	255	166	1.00	1.5	13	3.7	14
United States	340	159	0.96	2.6	19	4.0	21

Source: Lee R. Martin, Economic Development and Investment in Human Resources, unpublished manuscript, Tables 17, 18, 20, 21, 23, and 11.

<sup>a</sup>Enrollment in public and private schools.

human agent) in the South is quite high. With slightly greater sacrifices than other states are now making, low-income states could bring their human capital much nearer the optimum.

### PRIVATE CAPITAL

Several characteristics of the existing structure of agriculture are very important in the problem of obtaining optimum combinations of factors, including capital in all forms. Institutions for separating provision of capital funds from decision-making are not as fully developed in agriculture as they are in manufacturing, trade, insurance, transportation, communications, and mining. In farming, with only a few important exceptions, these two functions (providing capital and management) are performed by the same individual. Considerable tenancy remains in agriculture, but it is still regarded as a step on the way to full ownership, particularly by tenants themselves. The volume of cash renting is increasing—largely in the form of renting additional land to supplement land owned. Hiring custom services is now more important in agriculture and is another capital-saving device for farm operators.

Finally, vertically integrated systems including farm production have developed rapidly in broilers, table and hatching eggs, turkeys, feeder pigs, and processing vegetables, among others. However, this device has not been used so much to enable management to be separated from the provision of capital as it has to remove most of both functions from the farm. For example, broiler growers furnish production labor, a little capital and management, and bear some, but not all, of the risks associated with the market.

By and large, farming is still characterized by having management and ownership of the farm's resources in the same individual. This functional rigidity magnifies the importance of investment in those human agents who own the material farm capital. Failure to invest adequately in even 10 percent of the farm resource owners will affect resource use efficiency and incomes of the farm resource owners themselves. When the human capital embodied in the farm resource owners in the South is inadequate for more than half of them (as the author believes), then the implications become much more serious, particularly for the underprivileged group itself and for that region having more than its share of underprivileged managers.

As far as getting the optimum quantities and forms of capital under the control of farm operators is concerned, estimates of capital productivity on farms must be worked out for the combination of farm operator and physical resources under his control. Any mechanical estimates of productivity of physical resources by themselves are likely to be far wide of the mark in the southeastern states. Lending agencies in these states are likely to be ultraconservative in making farm loans because of the difficulty in judging the quality of the human factor in the production relationship. Because of the great importance of the

quality of the human factor, the a priori probability may be small for selecting a combination of farm and farmer for whom the combined marginal value productivity of capital would be high enough to justify investment of capital funds. In low-income areas this situation is likely to lead to rules of thumb (in terms of collateral, etc.) that do not give the really competent individual with few resources the same opportunity to become a decision-maker that good managers have in the nonfarm sectors.

Even when average capital productivity in a given area is relatively high, the lending agency cannot average out the high returns possible for good managers with the negative returns for managers who only appear to be good. An unsubsidized lender must be very successful in a low-income area, or else he will become bankrupt.

In the past, the Extension Service and other educational agencies in agriculture operated on the philosophy that a farm operator with a moderate amount of potential for management could, by means of intensive technical assistance, be brought to a level of efficiency that could be maintained with information flowing normally through established communications channels. The flow of new technical agricultural information has become so large and steady—and often so complicated—and the income penalties for not operating farms near the economic optimum so great that many farmers in low-income areas may not be able to operate a large resource bundle efficiently. Farm situations lending themselves to piped-in management are already becoming parts of vertically integrated systems. Situations not adaptable to piped-in management require decision-makers representing enough human capital that they can, with extensive assistance from the Extension Service and other agencies, obtain and interpret the flow of relevant technical information well enough to make near-optimum economic and technical decisions.

One field of science relevant to farm decision-making is learning theory, (cf. Chapter 20). For an individual decision-maker, the vital factor is the rate at which he learns. During a period of gradual change in technology and culture, the required learning rate may not be very high. In a period of rapid change, the essential learning rate grows in several dimensions. Not only do the volume and nature of information change rapidly, but information channels themselves are in a state of flux. Criteria for selecting the relevant information change drastically. The practical simplifications (rules of thumb) that proved so helpful in a more static period become useless and confusing. Techniques for optimum application of the relevant information grow in complexity. How can an individual achieve the required learning rate? Success in formal education requires a certain rate, and once acquired, this ability to learn at a given rate can be maintained and perhaps made more effective by continued application to flows of information from all sources.

It is only a slight oversimplification of our farm situation to state that the technological revolution increased considerably the learning



rate that is essential for farmers to make near-optimum decisions. Are there not a large number of farmers (especially in the South) whose formerly satisfactory learning rate is now inadequate? On their own, these farmers have not been able to step up their learning rate enough and no completely effective means for helping them has been developed. Even the lack of motivation to change (pointed out so sharply and frequently by sociologists) may be a psychological reaction of inadequacy brought on by intuitive recognition of inability to achieve the required rate. Has not our approach been too much one of imparting a given stock of information rather than one of developing the ability to use flows?

### Capital Productivity in a Sector with Overcapacity

Still another situation complicates the problem of achieving optimum combinations of factors. The marginal revenue product of another bale of cotton or of another bushel of wheat is probably negative in the minds of some policy-makers. To our society, these marginal values are probably well below present support prices. There is no certainty that future prices will move nearer to free market levels. Yet, forced to guess whether prices are more likely to move nearer to or away from free market prices, most agricultural economic analysts would select the former. If price projections obtained by Iowa State University researchers<sup>7</sup> or findings published in 1960 in Senate Document 77 are reliable, freer markets would bring lower prices. Even for farm commodities that will continue to have price supports, the outlook is generally for lower support levels.

What effect does this outlook have on lenders with their problem of pricing the additional output that will result from the use of additional capital? Whether farm management analyses are made with the use of budgeting or linear programming, the problem of pricing additional outputs during the investment period becomes more and more perplexing, particularly if estimated farm incomes are to be compared with incomes in the nonfarm sector. If declining prices are in prospect for most farm products, will not physical productivity of embodied capital have to be higher than before for given capital investments to be economical?

A similar effect results from increases in interest rates. With higher interest rates, profitability requires greater physical productivity from a capital form. For a capital good estimated to increase income by \$100 a year for ten years, the present value of the income generated would be \$810 if the future income is discounted at 5 percent, and only \$766 if the discount rate is 6.5 percent. Thus the physical

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<sup>7</sup> Leon E. Thompson, "Return to a free market," Iowa Farm Sci., Vol. 14, No. 10, pp. 16-18, April, 1960. Some of the work of Paulsen, Kaldor, Shepherd, Kutish, Heifner, and Futrell are summarized by Thompson.

productivity of a capital good would have to be almost 6 percent greater for profitability with an increase in discount rate from 5 to 6.5 percent.

Low-income farmers are faced with still another capital problem. A capital investment is justified if the sum of the discounted future net benefits exceeds present net cost. From the lender's viewpoint, the availability of greater future incomes out of which principal can be repaid is a necessary but not a sufficient condition for a good loan. If the increase in income is just enough for principal repayments and interest, the family must postpone any increase in its living standard in order to accumulate capital. If the capital investment does not add enough income to allow some increase in consumption, risks of defaults on payments are likely to be rather high.

An examination of the experience of the Farm Security Administration in lending to farm families in the Georgia Piedmont gives some idea of the potential for small farm operators to accumulate capital internally. When prices were adjusted to the 1948 level, the average of 76 families making enterprise adjustments increased net cash income by \$500, increased cash living expenses by \$300, and had \$200 in additional cash income.<sup>8</sup> Thus 40 percent of the additional income was available for capital accumulation. Only in the case of one type of adjustment was the amount left for investment more than half of the gain in income, and this was accounted for by a small gain in net income in a form that was not available for consumption. Those families whose enterprise combinations yielded highest net incomes had the lowest average percentage of additional income available for capital accumulation. For these Georgia families, the marginal propensity to consume seemed to rise with growing incomes. This indicates an understandable reluctance on the part of low-income families to postpone the "better life" until much capital formation has taken place.

This has unusual relevance to the problem of capital formation in agriculture since the capacity of low-income farmers to accumulate capital out of net income is quite limited. Spitze indicates the importance of net farm income in capital formation within agriculture in Chapter 2. Hendrix's data indicate that low-income farmers will be able to achieve larger scales of operations (and higher incomes) only by means of capital made available from off the farms. Repayment of external capital may require lower marginal propensities to consume than can reasonably be expected.

One might speculate that an amount of external capital is needed to provide a take-off into income growth for low-income farmers. This amount may be substantial, and might enlarge the scale of operations more rapidly than managerial ability can be assisted to accommodate this growth. Yet a large lump of capital may be required in order to increase income enough to allow simultaneously a minimum increase in consumption, repayment of capital, and future capital accumulation

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<sup>8</sup>W. E. Hendrix, *Capital Accumulation by Families on Small Farms in the Piedmont*, Ga. Agr. Exp. Sta. Bul. N.S. 8, Aug., 1955, pp. 20-22.

from net income. In one decade, external capital made available to farmers was only one-ninth of internal capital formation (cf. Chapter 2). In the past, capital formation from internal sources was largely confined to periods of farm price inflation, and the prospects for farm prices in the early 1960's are not favorable.

### Supply of Capital

Disregarding the question of the effectiveness of capital institutions, will enough capital be available for southern agriculture, U. S. agriculture, and particularly for the low-income group in agriculture? The answer to this question depends upon what our society elects to do about overcapacity in agriculture. At present, agriculture is characterized not only by the allocation of more human resources than is required, but also by the use of more land than is required to produce needed goods for consumption and export, and to make allowances for production fluctuations. To bring production and utilization into balance, between 50 and 100 million acres of land may need to be retired from agricultural production—the exact figure depending upon which acres are selected for retirement.

Capital needs will depend upon the land retirement method used. This subject is also discussed by Coutu and Lindsey in Chapter 21. If land is retired by government purchase at 1960 market values, then a large portion of capital will be "released." If entire units are purchased, sellers are likely to transfer their labor services to the non-farm sector, and are almost as likely to use their liquid capital in the nonfarm sector. Even if some sellers reinvest in agriculture and continue to operate a farm, farmers who sell to them are likely to transfer their labor and capital to nonfarm activities. Some sellers must transfer completely if the quantity of human resources employed in agriculture is to be reduced. Retirement of land by purchase might lead to a need for much additional capital in agriculture, i.e., more if low-income farmers form the capital, less if farmers who are better endowed with resources form the capital. The latter will be better able to form capital out of their own income. Some erstwhile farmers might reinvest in farm land and rent it to farm operators, thus providing capital to agriculture. Unfortunately, in low-income areas, owning land solely for income is not a well-established practice and is not always profitable in comparison with alternative investments. Institutions for separation of ownership and management of resources are not well developed for agricultural resources, particularly in the South. If the government rents land redundant to agriculture, this is not likely to add to agricultural capital unless rent receivers lend to farm operators as a rentier class.

Strong production controls to reduce overproduction would probably have the effect of destroying some of the present value of agricultural capital. Funds for any additional capital formation would need to come



from outside agriculture or from current farm incomes. How rapidly this capital formation would take place would depend to a great extent upon the farm price level that resulted from these stringent production controls.

It is possible to argue that the market value of capital in agriculture is adequate for efficient production of the volume of farm products demanded by society. If this happens to be the case, then the distribution among capital forms and among regions is not optimum.

### DATA ON PRODUCTIVITY OF PRIVATE CAPITAL

Numerous data are available on resource use and productivity and on the relations between resources used and incomes. Unfortunately, neither the conceptualizations, the analytical tools, nor the interpretations have been refined enough to give us complete confidence that we can measure input productivity precisely.

Singh made a serious effort to introduce the level of management explicitly into an analysis of low incomes in a North Carolina county. For each technically feasible farm enterprise considered for the county, one to three levels of input-output relations were developed corresponding to one to three levels of management. Appropriate input-output relations were selected for each farmer, and his aggregate capacity to manage was derived from his abilities on individual enterprises. It was assumed that each farmer could make an optimum selection of enterprises and could obtain control over complementing resources available in the community and dispose profitably of owned resources not profitable for him to use. The results of these analyses show the optimum resource positions that could be reached by considering only low levels of off-farm employment, and by considering two levels of additional investment capital (Table 4.2).

In general, more capable managers tended to use more resources and to earn much larger incomes. The tendency of better managers to use more investment capital was distorted somewhat by enterprises on which nonfarm firms provided much of the capital. Farmer 6 went into commercial layers, with all of the additional capital coming from a feed dealer; other livestock enterprises often required little additional capital from the farmer.

Conversely, less capable managers tended to use fewer resources in any optimum combinations with their own human resources. For these farmers the marginal revenue productivity of additional investment capital was likely to fall more rapidly and to reach zero much sooner than for a manager assumed to be more capable. For one farmer who was a fair manager (the lowest category), making available unlimited land at the appropriate rent for his community and unlimited capital at 5 percent would not raise his net farm income enough to get him out of the low-income category. One other assumption of the Singh study should be noted. Operating capital was not treated as a limiting factor;

Table 4.2. Estimated Resource Productivity of Eleven Farmers in Macon County, North Carolina

Farmer	Management level	Additional capital		Bottomland in acres		Upland in acres		Pasture in acres		MRP of capital Dollar for dollar	Income in dollars
		(Dollars)	(Dollars)	Avail-able	Used	Avail-able	Used	Avail-able	Used		
1 <sup>a</sup>	Good	2500 4900	14* 14*	33 0	8* 8*	5 0	0 0	22* 22*	10 9	0 0	6600 7900
2	Fair	1000 2900	6 6	132 53	22* 22*	22 13	21 0	31* 31*	5 4	0 0	3500 4200
3	Excellent	5000 8600	15 15	0 0	7 7	0 0	0 0	35* 35*	9 20	0 0	9000 10400
4 <sup>b</sup>	Fair	2600	25	55	28	28	29	43*	2	0	6700
5	Fair	2000	0	--	6	6	53	36*	11	0	2500
6	Excellent	0 <sup>c</sup>	14*	--	10	9	--	0	0	--	9100
7	Medium	3000 10000	6 6	131 54	30* 30*	14 10	0 0	62* 62*	37 37	0 0	3600 5300
8	Good	5000 8000	80* 80*	0 0	28* 28*	0 0	0 0	47* 47*	14 14	0 0	12100 13700
9 <sup>d</sup>	Good	7500 16500	15 15	41 0	40 40	15 0	0 0	100* 100*	42 75	0 0	7100 7800
10	Medium	0	38	32	23	0	0	68*	0	0	5700
11	Good	4000 11000	45* 45*	35 25	65* 65*	0 0	0 0	88* 88*	18 48	0 0	6200 7300

Source: Har Swarup Singh, Evaluation of Alternative Income Opportunities for Farm Operators in Macon County, North Carolina, unpublished Ph.D. thesis, North Carolina State College, Raleigh, N. C., 1958, pp. 161-207.

\*Includes land in the community that could be rented profitable, considering the rental charges on that class of land.

<sup>a</sup>Hired labor available at \$0.60 an hour.

<sup>b</sup>This farm had available the labor of 2 men.

<sup>c</sup>The commercial layer enterprise on this farm required no additional capital on the part of the operator. Capacity (valued at \$5,000 new) for 3,500 birds was already available.

<sup>d</sup>Hired labor assumed to be available.

it was assumed that the optimum volume required would always be available at 5 percent. This seemed reasonable in the county, but it does help account for some of the large increases in income. More will be said below about the productivity of operating capital.

Dr. Earl O. Heady has been a pioneer in efforts to estimate resource productivities and particularly to make interregional comparisons of the productivity of capital, labor, and land. Some of the selected Heady and Shaw data seem to indicate a high level of marginal productivity of capital—considering either the direct measure or changes in the marginal revenue productivity of labor as more capital is used (Tables 4.3 and 4.4). Yet values computed from data in the study left serious questions. Is not the intercorrelation between the capital available and the quality of management a strong possibility? If this is the case, would not the apparently high marginal productivity of capital on Alabama farms be a joint return not only to more capital but to better management and more efficient labor? The magnitude of residual products that must be imputed seems to indicate that the volume of conventional inputs falls far short of explaining total productivity.

Adding the original estimate of the value of labor and the residual product assigned to labor, and dividing the result by months of labor, yields interesting results. Is it not possible that high values of labor found on the farms with low volumes of labor and high volumes of capital are really due to imputing the value of labor and management to this labor, while additional labor seldom adds any management but is truly only an increment of labor? Whatever management the well-run units with low volumes of labor have is likely to be adequate with labor added.

Further reflections on the Heady-Shaw data cause doubt about what is being measured. In a discussion of problems encountered in studying resource productivity, Dr. Glenn L. Johnson stated: "Another difficulty which may arise from the managerial process is the following: superior managers may operate on superior production functions with more resources than their less capable counterparts. Thus, managerial ability, the efficiency of the production function used, and the amount of resources employed may be highly intercorrelated. Such correlation makes it difficult to separate the productivity of resources from increases in gross income due to use of superior production functions or superior managerial ability."<sup>9</sup>

There is reason for concern about the degree of intercorrelation and magnitude of its effect on productivity estimates. Further doubt arises on extrapolations from a Cobb-Douglas function. The invariant exponents require that increasing or decreasing returns to scale be the rule throughout the full estimating range. Since conventional wisdom

<sup>9</sup>Glenn L. Johnson, "Problems in studying resource productivity and size of business arising from managerial processes," *Resource Productivity, Returns to Scale, and Farm Size*, Earl O. Heady, Glenn L. Johnson, and Lowell S. Hardin (eds.), Iowa State University Press, Ames, Iowa, 1956, p. 19.



Table 4.3. Estimated Resource Returns and Productivity in Selected Farming Areas of Iowa, Montana, and Alabama, 1950

Item	Area	Low labor			Medium labor			High labor		
		level of capital			level of capital			level of capital		
		Low	Medium	High	Low	Medium	High	Low	Medium	High
Land investment (hundred dollars)	Montana	224	631	--	190	593	788	205	454	1108
	Northern Iowa	327	389	327	234	375	558	386	403	693
	Southern Iowa	107	204	319	86	152	262	104	220	324
Machine and livestock investment (hundred dollars)	Alabama	17	24	33	12	17	29	11	20	46
	Montana	68	134	--	87	179	271	93	191	500
	Northern Iowa	65	95	139	65	105	145	89	104	211
Total labor (months)	Southern Iowa	42	62	115	46	77	141	60	94	159
	Alabama	4	7	19	4	8	13	3	8	29
	Montana	7.6	10.8	--	18.7	18.0	18.3	24.8	27.5	37.6
Value of all labor (hundred dollars)	Northern Iowa	11.2	12.3	11.6	15.6	16.2	16.4	26.4	25.6	25.0
	Southern Iowa	11.4	11.6	11.4	14.3	14.3	14.6	20.2	22.2	24.3
	Alabama	6.0	7.7	6.9	12.3	12.9	13.7	19.2	23.3	22.4
Value per month of all labor (dollars)	Montana	18	30	--	38	40	41	46	61	87
	Northern Iowa	23	25	23	31	31	33	43	45	46
	Southern Iowa	23	24	24	29	29	30	38	40	45
Average residual product of labor (hundred dollars)	Alabama	6	8	7	12	13	14	19	23	22
	Montana	232	275	--	201	221	223	184	221	230
	Northern Iowa	206	203	195	197	189	203	162	177	186
Average residual product of labor (hundred dollars)	Southern Iowa	204	206	214	201	202	205	189	180	183
	Alabama	98	102	100	100	100	104	100	100	97
	Montana	112	225	--	23	95	97	48	75	70
Average residual product of labor (hundred dollars)	Northern Iowa	40	51	66	26	37	36	18	29	33
	Southern Iowa	22	35	54	15	27	45	15	19	29
	Alabama	5	8	10	7	9	13	8	6	9

Total return to labor (value of all labor and average residual product of labor) (hundred dollars)	Montana	130	255	--	61	135	138	94	126	157
	Northern Iowa	63	76	88	57	68	70	61	74	80
	Southern Iowa	46	59	77	44	56	75	53	59	74
	Alabama	11	16	17	19	22	27	28	30	31
Total return to labor divided by total labor in months (dollars per month)	Montana	1710	2357	--	325	752	754	377	459	416
	Northern Iowa	563	619	763	366	419	425	230	291	318
	Southern Iowa	400	508	672	306	389	513	263	266	303
	Alabama	176	209	251	155	167	197	144	127	138
Value of all capital services (hundred dollars)	Montana	46	101	--	60	101	188	68	106	332
	Northern Iowa	72	131	221	78	135	232	79	135	332
	Southern Iowa	44	81	146	45	84	160	49	84	196
	Alabama	6	11	24	6	11	27	7	12	41
Average residual return on investment (percent)	Montana	22.2	26.8	--	24.5	18.0	13.9	21.6	20.7	12.5
	Northern Iowa	8.3	10.2	13.2	6.1	8.7	7.1	3.7	7.9	7.3
	Southern Iowa	3.8	8.4	10.5	-2.1	6.1	10.5	-1.9	3.7	7.6
	Alabama	-9.9	-1.9	3.4	-21.8	-7.5	5.7	-35.0	-31.2	-0.7

Source: Earl O. Heady and Russell Shaw, Resource Returns and Productivity Coefficients in Selected Farming Areas of Iowa, Montana and Alabama, Iowa Agr. Exp. Sta. Bul. 425, April, 1955, Tables 30-33.

runs in terms of large increments of capital required to generate satisfactory incomes for low-income farmers in the South, there may be some question as to the usefulness of estimates outside the range of data.

A final doubt is also based on the usefulness of estimates by extrapolation. If principal reliance for higher farm incomes in the South must be on farm enlargement, then there is need to know whether optimum enterprise combinations will change as more capital is added. Unless enterprise combinations change little, there is reason to believe that the proportional and absolute inputs of land, labor, and capital would change drastically. At least, this is what Singh found in his study. The Heady-Shaw data seem to be consistent with this view, i.e., in each area, going from low labor and capital to medium labor and capital to high labor and capital added little to the marginal productivity of labor, and the increases shown may have been due in part to the characteristics of the functional form. Average returns to labor (including the residual) declined quite sharply in each of the four areas going from low, to medium, to high labor and capital.

In a recent study of the experience of families receiving loans through the Farmers Home Administration (FHA), Hendrix has published some most interesting results.<sup>10</sup> Assuming that productive capital is land and buildings plus working capital, in the North the average borrower originally had \$6,600 in productive capital, borrowed \$3,200, and increased his income by \$1,300 (69 percent) and his net worth by \$4,753 (100 percent). In the West, starting productive capital of \$16,300 plus a loan of \$4,100 led to an increase of \$1,638 (63 percent) in net income and an increase of \$5,570 (61 percent) in net worth. In the South, \$6,500 in productive capital and a loan of \$2,200 was associated with a gain of \$540 (32 percent) in income and a gain of \$2,100 (42 percent) in net worth. These data indicate that additional capital in association with the management ability of the particular borrowers was more productive in the North and West than in the South, even though the FHA attempts to assist borrowers in making management decisions. Comparisons of white borrowers and nonwhite borrowers in the South indicate no essential differences between them in income-earning capacities, holding working capital and off-farm employment constant. One might speculate that FHA budget limitations in relation to the number of potential borrowers in each region allowed more selectivity among nonwhite applicants in the South than among white applicants, and more selectivity among all applicants in the South than among all applicants in the North and West. Thus in the South, the average nonwhite borrower might be expected to be further above the average management ability of all nonwhite farmers than the average white borrower is above the average management ability of all white farmers. Similarly, the average borrower in the South is probably further above the average

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<sup>10</sup>William E. Hendrix, *Approaches to Income Improvement in Agriculture*, USDA, ARS Prod. Res. Rpt. No. 33, Washington, D. C., Aug., 1959, pp. 6, 11, 14, and 22.



Table 4.4. Estimated Marginal Productivity of Land, Labor, and Capital Services in Selected Farming Areas of Iowa, Montana, and Alabama, 1950

Item	Labor	Montana			Northern Iowa			Southern Iowa			Alabama		
		Capital services			Capital services			Capital services			Capital services		
		Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Marginal productivity of land (in dollars per acre)	Low	9.3	10.0	10.6	42.8	43.8	45.1	25.9	27.8	36.4	13.6	18.0	17.5
	Medium	9.4	10.2	10.1	43.5	45.3	47.4	28.0	32.2	34.5	18.0	20.0	21.8
	High	9.7	10.5	11.2	45.4	47.2	48.9	28.6	32.9	37.6	21.0	21.4	23.2
Marginal productivity of labor (in dollars per month)	Low	59.3	95.1	123.6	67.4	84.3	117.1	34.5	64.1	127.9	38.8	52.7	81.6
	Medium	32.8	64.1	82.1	51.7	62.5	104.0	30.9	56.1	81.6	27.4	39.1	56.6
	High	25.6	35.7	59.7	31.2	44.0	73.6	15.1	35.1	59.1	19.6	26.2	42.0
Marginal productivity of capital (in dollar for dollar of machine-crop services)	Low	2.0	2.1	2.2	.6	.6	.6	1.3	1.5	1.2	1.0	0.8	0.8
	Medium	2.2	2.2	2.4	.7	.6	.6	1.4	1.3	1.4	0.9	1.0	0.9
	High	2.2	2.2	2.4	.6	.6	.7	1.3	1.5	1.5	1.4	1.4	1.1
All land in acres	Low	727	1493	--	148	182	186	118	185	208	34	41	59
	Medium	875	1874	2210	123	189	264	137	175	213	27	44	53
	High	1300	2020	5286	164	212	296	154	230	210	28	47	80
Land investment (in dollars per acre)	Low	31	42	--	221	214	176	91	110	154	50	59	57
	Medium	22	32	36	190	199	211	62	87	123	46	39	55
	High	16	22	21	235	190	234	68	95	154	38	42	58
Marginal productivity of investment in land (in dollar for dollar of investment)	Low	.29	.24	--	.19	.20	.26	.28	.25	.24	.27	.30	.31
	Medium	.43	.32	.28	.23	.23	.22	.45	.37	.28	.39	.51	.40
	High	.61	.48	.53	.19	.25	.21	.42	.35	.24	.55	.51	.40

Source: Heady and Shaw, *op. cit.*, Table 25.

Table 4.5. Estimated Average Improvement Expenditures and Increase in Net Income per Farm for 7-Year Improvement Programs for 56 Farms

Item	Georgia	Indiana	Kentucky	Nebraska	Total or average
Number of cases	13	14	18	11	56
			(Dollars)		
Improvement expenditures in 7 years	34,948	17,416	14,792	10,084	19,207
Net income at start of improvement program	3,503	4,453	2,378	2,016	3,087
Expected net income at end of improvement program	6,231	7,464	4,789	3,977	5,633
Increase in net income	2,728	3,011	2,410	1,961	2,546
			(Percent)		
Relative increase in net income	78	68	101	97	82
Rate of annual return expected from improvements	8	17	16	19	13

Source: L. E. Kreider, *Farmers' Needs for Intermediate-Term Credit*, Farm Credit Administration, Bul. CR-6, Oct., 1954.

management ability of all southern farmers than the average borrower in the North or West is above the average management ability of all northern or western farmers.

The results of a study conducted by Kreider show much greater income productivity for "land improvement expenditures" in Nebraska, Indiana, and Kentucky than in Georgia (Table 4.5). Southern and Hendrix found that 53 percent of the 88,060 rural family heads in northeast Texas could be considered to have "human resource limitations" that would presumably influence their economic productivity. For 15,100 full-time farm family heads, the estimate was 52 percent.<sup>11</sup>

Three other studies suggest somewhat unexpected productivities for operating capital. An analysis by Heady and Swanson reported that, on Iowa farms, additions to operating capital in several forms would add to net incomes, and that farmers believed this to be the case.<sup>12</sup> Foreman's study of owner-operated farms in the Georgia Piedmont also indicated that additional operating capital on these farms had more effect on incomes than any other step considered.<sup>13</sup> A report by Baker and Stoevener on the productivity of soil fertility outlays in two Illinois

<sup>11</sup> John H. Southern and W. E. Hendrix, *Incomes of Rural Families in Northeast Texas*, Tex. Agr. Exp. Sta. Bul. 940, Oct., 1959, pp. 28-29.

<sup>12</sup> Earl O. Heady and Earl R. Swanson, *Resource Productivity in Iowa Farming*, Iowa Agr. Exp. Res. Bul. 388, June, 1952, pp. 751, 756, and 767.

<sup>13</sup> W. J. Foreman, *Resource Returns and Productivity Coefficients on Owner-Operated Farms in the Piedmont of Georgia*, Ga. Agr. Exp. Sta. Tech. Bul. N.S. 9, Dec., 1956, pp. 29-38.

farm areas (one containing primarily livestock farms and the other comprised largely of crop farms) also indicated that larger outlays on fertilizer would be profitable.<sup>14</sup>

On small farms operated by less capable managers, capital shortages will persist for a long time. The productivity of capital on large farms with capable managers will remain high, and this group is likely to form most of the private farm capital, whether from external or from internal sources. Farming areas specializing in surplus products are likely to encounter financing difficulties because of unfavorable price prospects and associated uncertainty. Areas combining inadequate human capital formation with surplus products will have all the appearances of severe capital need, but more improvement in income can probably be achieved in the long run through greater investments in our young human resources and in the short run by the development of better institutions for human capital formation among adults.

## *Discussion*

### SYDNEY D. STANIFORTH\*

Martin very clearly indicates at the outset that his discussion is concerned with the income effects of capital on low-income farms. He concludes that a major part of the low income and low average productivity is due not to a misallocation of capital as such between size groups and between regions, but to rather serious management limitations. This is something to which we might readily agree without appreciating its implications. These implications are developed very effectively and, as such, represent a generous contribution to our attack on these capital problems.

The analysis of relative productivities of capital in different regions and in different size groups is penetrating and extremely valuable. The conclusions constitute the basis for a very important reorientation of our approach to capital allocation problems. Martin concludes that, while most studies show the marginal productivity of capital to be high in the South or other low-income areas, more capital cannot be expected to raise incomes very much in these areas because high marginal productivities depend on a higher level of management than these farms now have. Consideration of this conclusion can save us from some serious mistakes.

We can heartily agree that long-run investments designed to increase the level of management and economic responsiveness of farm people, thereby increasing the level of economic welfare, is very

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<sup>14</sup>C. B. Baker and H. H. Stoevener, *Livestock and the Productivity of Soil Fertility Outlays*, Farm Mgt. Rpt. No. 189, Univ. of Ill., June 22, 1959.

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important, particularly in depressed areas of agriculture. Effective short-run methods are also to be sought. In this whole problem, however, one should follow Martin's own warning not to extrapolate expected high marginal productivities of capital beyond what we know to be forthcoming. Just because the marginal productivities of capital invested in the human factor look like they would be high in low-income areas, substantial amounts of capital might be invested there with relatively low response.

The conclusion that the already larger and more efficient farms will form most of the new capital from both internal and external sources in the years ahead has important implications. It suggests a wider separation income-wise between what is considered the commercial producing sectors and the low-income, or unemployed, sectors. By implication at least, this suggests that we can no longer attempt to treat the adjustment problem as a single problem. The low-income and aggregate production problems must be treated separately, coordinating such treatments to assure consistency but recognizing the fact that there is no single solution.

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## *Trends in Credit and Capital<sup>1</sup>*

**H**ISTORICALLY, the conditions relating to the availability of credit to agriculture have been one of the major reasons for farmer discontent. Prior to about 1940, farm credit problems were of major concern to policymakers, and there was a substantial amount of professional interest in credit problems among agricultural economists. Since World War II the major interest of both groups has been concentrated upon price and income policies, and too little attention has been given to the effects of credit upon the income of farmers.

### CREDIT AND CAPITAL FORMATION IN AGRICULTURE

An individual farmer or the agricultural industry may acquire increased capital to combine with other resources through savings from income, grants and inheritances, windfalls, renting, or the use of credit. In addition, persons in agriculture may use credit to transfer the ownership of existing assets from one individual to another within the industry, or from an individual outside the industry to one within. With such transfers, no new capital is made available to the industry even though the amount of credit used may rise.

The most comprehensive view of the long-time changes in the capital structure of agriculture is contained in the work by Tostlebe, which was cited frequently in Chapter 2. His conclusions were: (1) that external financing has played a relatively minor role in the financing of net capital growth in agriculture — a major exception appears to have been the decade 1910-20; and (2) since 1910 the capital growth in agriculture has been much more heavily concentrated in machinery and motor vehicles and less in real estate and livestock (Chapter 2). Tostlebe predicted this trend would continue. Since the end of the period covered by his work was about 1950, it is apropos to attempt an approximation of the trends of the 1950-1960 decade to determine how they compare with the long-time trends of earlier periods.

On the basis of present data, several generalizations of importance

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<sup>1</sup> The author is indebted to James T. Bonnen and Glenn L. Johnson for their constructive criticisms and suggestions.

appear warranted. First, the rate of gross and net capital formation in agriculture was very high during the period 1945-54, with major increases in investment in both real estate and machinery. After 1954 the growth in net investment slowed appreciably, with a sharp decline in machinery investment accompanied by a modest decline in real estate investment. During the five years, 1955-60, there appears to have been no net increase in capital invested in machinery and equipment in U. S. agriculture, and the data may prove to be slightly negative when the final revisions are made. Meanwhile, the investment in real estate, which has been underestimated in recent years, appears to have continued at a relatively high rate when considered from a historical viewpoint.<sup>2</sup>

Perhaps the most notable feature of the postwar period has been the importance of external capital sources to the growth in investment. Whereas Tostlebe showed a long-term rise in the proportion of internal financing of capital in agriculture, this trend has reversed in the postwar period. Thus, in each successive five-year period since 1945, the portion of capital growth financed externally has risen. In 1959, external financing as a proportion of capital growth in U. S. agriculture may have been at an alltime high.

Thus, the availability of credit to agriculture and the terms under which it may be obtained have become much more important than has hitherto been assumed. As long as capital formation in agriculture was primarily financed internally, credit conditions in agriculture greatly affected income distribution in agriculture. However, if capital formation has become dependent upon external financing, then the total productivity of the industry is related to the conditions under which it can obtain credit. Therefore, the area of concern is much greater than if credit were considered primarily as a means of transferring the ownership of existing assets among various persons.

Even though the transfer of ownership does nothing to create new capital in agriculture, its importance under certain conditions should not be overlooked. It has been suggested that capital gains in agriculture may tend to compensate farmers sufficiently for low returns to labor so that over a person's lifetime the accumulation of assets by a farmer may approach those of his nonfarm counterpart. However, capital gains can be realized only through ownership of the asset involved. Therefore, the provisions of credit which enables farm families to gain ownership of these assets may have important effects upon the long-time well-being of these families in a period when the market value of these assets is appreciating significantly.

In view of these facts, it can be argued that adequate credit for agriculture is important because it is an increasingly important source of new capital, and it allows farm families to capture any capital gains that may accrue to the owners of agricultural resources.

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<sup>2</sup> The current figures for investment in real estate include only buildings and do not include investment in land improvement, drainage, permanent pastures, etc. Expenditures on such investments appear to have been very substantial since 1945.



## Farm Mortgage Credit

Credit extended to agriculture tends to be classified in terms of the security offered rather than in terms of the purpose for which it is used. For instance, it is often assumed that farm mortgage debt is largely credit to transfer the ownership of real estate with little or no effect upon capital formation in agriculture. A closer examination of the available data suggests this is not true. Thus, in the quarter ending June 30, 1959, the purposes for which 21 major life insurance companies granted loans showed that only one-third of the total amount borrowed was used for farm real estate purchases.<sup>3</sup> Twenty-nine percent was used to refinance existing mortgages, and 17 percent to pay off other existing debts. Eight percent was used for repairs and improvements to land and buildings, and 13 percent for other purposes. At most two-thirds of these loan funds can be identified as merely providing credit to transfer farm ownership, and the actual percentage used solely for this purpose may be considerably lower.

About one-half of the farm mortgage loans granted by the Farmers Home Administration during the same period was used for real estate purchases and one-fourth to refinance existing mortgages. The remaining loans were used primarily for capital improvements.

A mid-1956 survey of farm loans by commercial banks showed that only 57 percent of the loans secured by real estate mortgages were used to buy land. This was well below an estimated 70 percent of mortgage loans used to buy land in a 1947 survey.<sup>4</sup> The sharp increase in the use of credit secured by farm mortgages to finance intermediate-term investments is not surprising in view of certain conditions which will be discussed later.

Keeping in mind that real estate credit advanced to farmers is related to security and not necessarily to purpose, an examination of some of the aggregate trends in these figures is presented here. On January 1, 1959, outstanding real estate debt amounted to an alltime high of \$11.3 billion. This was more than double the postwar low of \$4.8 billion in 1946. As yet, however, the annual volume of mortgages recorded or loans made in a single year remains well below the 1920 peak. The increase in total debt outstanding despite a lower annual volume is, of course, due to the increased share of loans now coming from sources which generally make longer term loans.

Virtually everyone is aware that the annual volume of farm mortgage credit fluctuates rather violently depending on the level of prosperity in agriculture. It is often presumed that the growth of federally sponsored credit agencies for agriculture has resulted in their replacing the conventional lending institutions — banks and insurance

<sup>3</sup> Farm Mortgage Lending Experience of Life Insurance Companies, the Federal Land Banks, and Farmers Home Administration, July through September 1959, USDA, ARS, Washington, D. C., Jan., 1960, pp. 43-116.

<sup>4</sup> "Loans to buy farm real estate," Farm Loans at Commercial Banks, Board of Governors of the Federal Reserve System, p. 37.

companies — as sources of farm mortgage funds. This, however, has not been the case, except for emergency years of the Great Depression (Table 5.1).

Table 5.1. Proportion of Total Farm Mortgage Loans Made or Recorded by Principal Lenders, United States, 1910-59

Date	Total (all lenders)	Loans made				Mortgages recorded		
		Federal Land Banks	Federal Farm Mortgage Corp.	Joint-stock land banks	Farmers Home Administration	Insurance companies	Commercial and savings banks	Individual and miscellaneous
(Percent of total)								
1910	1,249,885					8.43	16.62	74.95
1920	3,625,780	1.85		.53		10.67	18.29	68.60
1930	1,364,625	3.45		*		12.73	26.03	57.40
1935	1,061,693	23.32	18.45			7.35	16.62	34.26
1940	772,462	8.28	4.71		5.12	18.83	28.46	34.60
1945	1,054,430	8.71	2.72		1.64	13.76	29.66	43.50
1950	1,655,895	12.26	*		2.75	21.00	28.48	35.51
1951	1,770,248	11.94	*		2.72	21.54	25.90	37.90
1952	1,777,619	14.15	*		2.94	19.42	27.22	36.26
1953	1,853,627	15.43	*		1.94	21.26	26.11	35.25
1954	1,885,499	16.01	*		1.42	20.69	26.52	35.35
1955	2,401,864	20.10	*		.64	21.05	24.23	33.99
1956	2,387,627	21.81			1.69	20.37	22.11	34.01
1957	2,253,977	17.91			3.22	17.19	22.30	39.38
1958	2,432,612	19.42			3.26	16.02	22.81	38.49
1959	2,814,278	22.26			2.92	15.97	21.51	37.34

Source: Agricultural Finance Review, USDA, ARS, Washington, D. C., Sept., 1960, p. 120.

\*Less than 1 percent.

Instead, the largest decline as a source of farm mortgage credit has been in the group classified as "individuals and miscellaneous" lenders. Prior to 1920, the data indicate that this group of lenders supplied about two-thirds of the annual mortgage credit used by farmers. However, this lending group accounted for less than 40 percent of the annual volume of mortgages recorded during the 1950-60 decade.

Commercial banks are the second largest suppliers of annual mortgage loans, accounting for approximately one-fourth of the volume of mortgages recorded. Except for the years of acute depression and bank distress in the 1930's, the commercial banks have provided a relatively stable proportion of the annual mortgage loans recorded — about 25 to 30 percent.

Insurance companies account for about one-fifth of the farm mortgage loans recorded annually. Their proportion has shown a slight decline but in 1959 was still well above the proportion of total loans made prior to 1930.

The federal agencies, or federally sponsored lending institutions, have played a major role in the farm mortgage credit picture since the 1930's. From 1932 to 1934 the proportion of mortgages recorded by

Table 5.2. Farm Mortgage Debt: Percentage of Total Loans Held by Principal Lenders, and Total Outstanding, United States, 1910-60

Date	Total farm mortgage debt	Federal Land Banks	Federal Farm Mortgage Corp.	Joint-stock land banks	Farmers Home Administration	Life insurance	Commercial and savings banks	Three-state credit agencies	Individual and others
(Percent of total)									
1910	3,207,863					12.06	12.66		75.27
1920	8,448,772	3.48		.71		11.54	14.26		70.01
1930	9,630,768	12.48		6.62		22.00	10.35	1.00	47.55
1935	7,584,459	25.68	8.13	3.65		17.16	6.58	.87	37.93
1940	6,586,399	30.51	10.83	1.39	*	14.94	8.11	*	33.26
1945	4,940,915	24.48	7.03	*	3.92	18.99	9.16		35.97
1950	5,579,278	16.24	1.05		3.38	21.01	16.80		41.51
1951	6,071,345	15.60	.72		3.53	22.33	16.61		41.21
1952	6,588,270	15.09	*		3.54	23.39	15.89		41.59
1953	7,154,038	14.98	*		3.61	23.97	15.45		41.66
1954	7,656,186	15.27	*		3.50	24.72	14.78		41.50
1955	8,175,724	15.50	*		3.32	25.09	14.81		41.13
1956	8,962,239	16.52			3.10	25.35	15.02		40.01
1957	9,907,623	17.38			2.92	25.00	13.99		40.70
1958	10,507,032	18.06			3.23	24.55	13.46		40.70
1959	11,254,264	18.35			3.45	23.65	13.43		41.12
1960	12,291,388	19.00			3.55	22.95	13.22		41.28

Source: Computed from data in Agricultural Finance Review, *op. cit.*

\* Less than 1 percent.



the Federal Land Banks rose from 3 to 40 percent of the total. Following the depression crisis, the proportion of annual volume furnished by the Land Banks declined until near the end of World War II. In the next ten years, a period of steady increase in mortgage debt, the proportion of the total mortgage loans made by the Federal Land Banks more than doubled and in 1959 accounted for about one-fifth of the mortgage loans made annually. Murray also presents relevant data on mortgage loans in Chapter 11.

The Farmers Home Administration inherited a mortgage loan program designed to serve a restricted group of farmers. Since the FHA must depend upon Congressional appropriations for funds, it has furnished a declining proportion of the total mortgage funds for agriculture since the beginning of World War II. In the 1950's the FHA provided only about 2 to 3 percent of the mortgage funds loaned in a given year.

However, since the length of mortgage loans varies widely among lenders, the total mortgage credit outstanding to farmers at any given time depends upon both annual loan volume and length of maturity. Thus, while banks accounted for 20 percent or more of the total volume of mortgage recorded annually in the early 1950's, they held only 13 percent of the total mortgage debt outstanding in 1958 (Table 5.2). On the other hand, insurance companies, whose loans are for longer terms, accounted for an estimated one-fourth of the loans outstanding on the same date. The generally longer terms of the Land Banks also increase their relative importance as a source of funds.

The shift toward lending institutions with longer term loans is illustrated by a comparison of the percentage changes in the amount of mortgage loans outstanding (Table 5.3). The life insurance companies and Land Banks have increased their mortgages outstanding since 1950 at about twice the rate of insured commercial banks, and at a considerably higher rate than individuals and miscellaneous lenders.

The increase in farm mortgage credit has not been at the same rate in all regions of agriculture (Table 5.4). The Pacific and Mountain regions had a sharp rise in mortgage credit outstanding in the 1945-50 period. The South and the Northeast had moderate expansions of mortgage credit during this period, whereas the Lake States, Corn Belt, and Northern Plains regions had no change or decline.

During the 1950-55 period, the rate of expansion in mortgage credit was highest in the Mountain and southern regions. The Lake States and Corn Belt regions underwent a slower expansion in mortgages outstanding. The expansion in mortgage credit was also at a more rapid rate in the Southeast, Delta, Mountain, Pacific, and Northern Plains regions during the 1955-59 period.

Thus, in terms of rate of increase in mortgage credit over the period considered, the Mountain, Southeast, Delta, and Pacific regions have led. Moreover, in terms of absolute or dollar expansion in mortgage loans outstanding, the Mountain and Pacific regions have ranked behind only the Corn Belt. Although the relative rate of expansion in

Table 5.3. Farm Mortgage Debt: Amount Outstanding, by Lenders, Selected Years, January 1, 1940-55 and 1957-59, and Percentage Change, 1950-59 and 1958-59, United States

Year	Federal Land Banks <sup>a</sup>	Federal Farm Mortgage Corporation <sup>a,b</sup>	Farmers Home Administration <sup>c</sup>	Life insurance companies <sup>a</sup>	Insured commercial banks	Individuals and miscellaneous	Total debt
(Million dollars)							
1940	2,010	713	32	984	534	2,313	6,586
1945	1,210	347	195	938	450	1,801	4,941
1950	906	59	193	1,172	879	2,370	5,579
1955	1,267	13	287	2,052	1,136	3,534	8,289
1957	1,722	0	290	2,477	1,311	4,108	9,908
1958	1,897	0	340	2,579	1,341	4,350	10,507
1959	2,065	0	388	2,661	1,443	4,697	11,254
Percentage change <sup>d</sup>							
(Percent)							
1950-59	127.9	-	100.7	127.0	64.0	98.2	101.7
1958-59	8.9	-	14.2	4.6	7.6	7.3	7.1

Source: The Balance Sheet of Agriculture, Agr. Info. Bul. No. 214, ARS, USDA, Washington, D. C., Oct., 1959, p. 25.

<sup>a</sup>Includes regular mortgages, purchase money mortgages, and sales contracts.

<sup>b</sup>Loans were made for the Corporation by the Land Bank Commissioner. Authority to make new loans expired July 1, 1947. On June 30, 1955, loans of the Federal Farm Mortgage Corporation were sold to the 12 Federal Land Banks.

<sup>c</sup>Data for 1940 include only tenant purchase loans and direct soil and water loans to individuals.

Thereafter, data include also farm development, farm enlargement, and project liquidation loans; farm-housing loans beginning July 1950; building improvement loans beginning 1955.

<sup>d</sup>Computed from unrounded data.

the Delta and Southeast has been high, the absolute expansion of mortgage credit has not been as large as in several other regions.

The question arises regarding whether the bulk of mortgage credit available to a region comes from within or outside the region. It is assumed that credit from banks, individuals, and miscellaneous lenders largely represents credit from within the region; whereas mortgage credit from Land Banks, insurance companies, and the Farmers Home Administration largely represents credit obtained from sources outside the region.

Using this rough measure, the proportion of mortgage credit that is financed within the region varies widely among regions (Table 5.5). In the Northeast, Lake States, Appalachian, and Pacific regions, indications are that the bulk of the mortgage credit is furnished from within the region since it is held by banks, individuals, and miscellaneous lenders. On the other hand, in the Corn Belt, Delta, Mountain, and Southeast regions, one-half or more of the mortgage credit comes from external sources. Also, in the Northern and Southern Plains regions, over 60 percent of the mortgage credit comes from sources outside the region.

In the Mountain and Pacific regions, there has been a rapid expansion in the mortgages held by life insurance companies. This source of

Table 5.4. Percentage Increases in Farm Mortgage Debt, by Regions, 1945-59

Region	Percent increase
Northeast	201.5
Lake States	179.8
Corn Belt	180.6
Northern Plains	169.5
Appalachian	267.4
Southeast	338.3
Delta States	302.6
Southern Plains	230.2
Mountain	396.6
Pacific	332.9
United States	227.8

Source: The Balance Sheet of Agriculture, Agr. Info. Bul. No. 214, ARS, USDA, Washington, D. C., 1959, p. 36.

credit seems to have been a major source of the growth in mortgage credit. Mortgages held by life insurance companies have also been a major source for the rapid rate of increase in mortgage debt in the Delta and Southeast. On the other hand, the Appalachian region, the Lake States, and the Northeast have had slower rates of increase in mortgage debt, and the amount of mortgage debt held by insurance companies and Land Banks is relatively lower.

An appraisal of the Appalachian and Southeast regions — which are generally regarded as the areas where the capital-man ratio and farm incomes are low — indicates that these regions still depend rather heavily upon internal capital for the financing of real estate debt. Also, the proportion financed internally has risen since 1940. The land contract has not been used as extensively in these regions, nor has its use expanded as rapidly as in other areas. Part of the explanation may be that the size of the units being transferred is generally smaller and can be more easily financed by local sources. Another explanation might be that these two regions have had sufficient internal credit available from individuals and banks. This, however, would seem unlikely in view of the rapid reduction in the labor force in these two regions with the resulting need to combine existing farms. Rather, it would appear that these regions may suffer from a lack of internal capital and, in addition, have an agricultural structure that is not generally able to compete with other areas for major sources of outside capital and credit.

At the other extreme are the Mountain and Pacific regions. These regions, in which the rate of mortgage credit expansion has been high



Table 5.5. Proportion of Farm Mortgage Loans Held by Various Lenders, 1945, 1950, and 1958

Division	1958				1950				1945			
	Federal Land Banks and Mort.		Life insurance companies		Federal Land Banks and Mort.		Life insurance companies		Federal Land Banks and Mort.		Life insurance companies	
	Corp.	Federal Land Banks and Mort.	Farmers Home Administration	All others	Corp.	Federal Land Banks and Mort.	Farmers Home Administration	All others	Corp.	Federal Land Banks and Mort.	Farmers Home Administration	All others
Northeast	14.5	5.8	2.0	77.7	15.0	5.0	2.2	77.8	21.7	.8	1.4	76.1
Corn Belt	17.0	34.9	1.8	46.3	16.9	35.4	1.8	45.9	23.5	31.4	1.8	43.3
Lake States	18.1	14.1	1.8	66.0	16.3	11.9	1.9	69.9	26.9	11.6	1.8	59.7
Appalachian	14.5	17.0	5.8	62.6	12.6	11.9	4.8	70.7	26.2	10.8	8.1	54.9
Southeast	19.7	18.1	8.1	54.1	19.3	8.2	9.4	63.1	34.3	5.3	13.7	46.7
Delta	15.6	30.9	8.8	44.7	16.1	22.7	11.8	49.3	26.6	17.2	12.5	43.7
Southern Plains	24.3	40.0	3.5	32.1	23.3	34.6	5.8	36.3	42.0	22.0	5.9	30.1
Northern Plains	27.8	29.5	3.1	39.6	28.7	30.6	2.9	37.8	47.7	24.1	2.2	26.0
Mountain	17.7	29.5	3.7	49.1	18.7	22.6	3.2	55.6	41.7	9.0	2.2	47.1
Pacific	13.3	15.3	1.6	69.9	14.4	15.5	.8	69.3	24.0	6.4	.8	68.8
UNITED STATES	18.1	24.5	3.2	54.2	17.8	21.7	3.5	57.0	29.5	17.7	3.4	49.3

Source: Computed from data in Agricultural Finance Review, *op. cit.*, and Agricultural Statistics, USDA, Washington, D. C., 1958.

have apparently been very attractive to outside lenders. Thus, mortgage credit in these regions has been expanded largely through loans from insurance companies, Land Banks, and the Farmers Home Administration.

In examining the farm mortgage credit structure from another viewpoint, one notices shifts over time in the regional distribution of loans made by those institutions which operate in various areas of the nation. One of the more striking shifts is the distribution of Farmers Home Administration mortgage credit away from its traditional concentration in the South with a corresponding rise in the proportion of loans in the Mountain, Pacific, and Plains regions. As mentioned previously, life insurance companies are sharply increasing the proportion of total mortgage loans in the Mountain and Pacific regions. Similar but less striking trends are shown in the proportion of total Land Bank loans to different regions.

There is another major source of credit to facilitate the transfer of farm real estate for which no estimates are available. This source is the purchase contract and other instruments by which the seller finances the purchase of farm real estate. Estimates by the USDA suggest that this source is of major importance in the transfer of land in some regions and that use of this method is growing. Such contracts were used to finance about 20 percent of all the land transfers in 1958.<sup>5</sup> This was about twice the figure for 1946. In the Lake States and Mountain regions, purchase contracts accounted for about 40 percent of the transfers, compared with about 18 percent in the Corn Belt. Such contracts are also used less frequently in the South. The rise in the use of such credit instruments may be due to the inability of purchasers to obtain conventional financing and to the fact that there are apparently tax advantages to the seller.

A source of real estate capital which is sometimes overlooked is the farm land owned by nonfarm persons and rented to farm operators. Despite the sharp decline in tenancy since 1940, there has been little change in the proportion of farm land that is owned by nonfarm landlords.<sup>6</sup> In 1940 the value of land owned by nonfarm landlords was 27 percent of the total, and in 1959 it was 23 percent of the total. The proportion of farm land owned by nonfarm landlords varies widely among regions. In the Corn Belt and Northern and Southern Plains regions, a much higher proportion of the farm land is owned by nonfarm landlords, while in the Northeast, Appalachian, and Southeast, the nonfarm landlords provide very little of this form of capital. The data cited indicate that the capital and credit market still, in 1960, is not performing as well in meeting the needs of southern agriculture as it is in meeting the needs of most other regions.

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<sup>5</sup> Agricultural Finance Review, USDA, ARS, July, 1959, p. 24.

<sup>6</sup> Balance Sheet of Agriculture, Agr. Info. Bul. 214, USDA, ARS, 1959, p. 10.

## Nonreal Estate Credit to Agriculture

The growth in the use of nonreal estate credit by the farm economy has been as rapid as the growth in real estate credit. Since 1940 there has been an approximate fourfold increase in the amount of such credit held by the principal lending institutions (Table 5.6).

Table 5.6. Nonreal Estate Loans to Farmers: Proportion Held by Principal Lending Institutions, United States, January 1—Selected Years 1915-60

Date	Total (excluding CCC)	All operating banks	Production Credit Association	Federal Intermediate Banks	Farmers Home Administration		
					Operating loans	Emergency loans	Emergency capital and feed
(Percent of total)							
1915	1,605,958						
1920	3,455,253						
1925	2,713,162						
1930	2,546,104						
1935	947,345	66.28	6.38	5.81	.59	9.19	11.74
1940	1,503,820	59.85	10.20	2.15	16.11	.53	11.16
1945	1,619,521	58.59	11.63	1.84	18.58	.84	8.53
1950	2,833,769	72.30	13.67	1.79	9.27	*	2.51
1951	3,366,254	74.98	13.39	1.84	7.53	.67	1.58
1952	4,063,463	76.79	13.82	1.92	6.05	*	.94
1953	4,214,996	75.80	14.22	1.97	6.67	.68	.66
1954	3,743,543	73.80	14.47	1.70	8.14	1.36	.53
1955	3,986,328	73.60	14.47	1.46	8.29	1.77	*
1956	4,420,483	74.84	14.58	1.40	7.23	1.65	*
1957	4,469,888	73.38	15.64	1.34	7.56	1.83	*
1958	4,993,983	72.19	17.74	1.35	6.97	1.59	*
1959	5,764,702	72.18	19.34	1.45	5.89	1.04	*
1960	6,661,178	72.27	20.43	1.34	5.19	.71	.06

Source: Computed from data in *Agricultural Finance Review*, *op. cit.*, p. 141.

\*Less than 1 percent.

Perhaps the most striking feature of the nonreal estate credit is the dominance of commercial banks as sources of these funds. At the close of World War II, commercial banks accounted for about 60 percent of the loans held by the principal lending institutions. By 1949 this percentage had increased to about 70, and since that time, the percentage has remained relatively stable.

The postwar period has seen a relative decline in the proportion of nonreal estate credit supplied by the Farmers Home Administration. At the end of World War II, the FHA programs provided about one-fourth of this type of credit used by agriculture. By 1959 this percentage was down to about 7 percent.

The Production Credit Associations have shown a rapid expansion in the proportion of the total nonreal estate loans held by principal lenders. On January 1, 1959, they held almost 20 percent of this type of credit outstanding, which was about double their percentage of 1945.

As in the case of real estate credit, wide differences are found



among regions in the relative importance of the major institutional sources of nonreal estate credit (Table 5.7). In the Corn Belt, the Lake

Table 5.7. Proportion of Nonreal Estate Loans to Farmers Held by Different Lending Institutions in Mid-1958

Region	Percentage of loans held by		
	All commercial banks	Farmers Home Administration	Production Credit Assoc.
Northeast	65.4	10.2	24.3
Corn Belt	77.1	4.8	18.0
Lake States	77.2	7.2	15.6
Appalachian States	62.0	8.9	29.1
Southeast	54.1	11.7	34.3
Delta States	48.0	13.9	38.1
Southern Plains	64.6	16.4	19.0
Northern Plains	80.7	8.4	10.9
Mountain States	68.3	10.0	21.7
Pacific States	79.7	4.1	16.1

Source: Computed from tables in Agricultural Finance Review, July, 1959.

States, the Northern Plains, and the Pacific regions, three-fourths or more of this credit is furnished by commercial banks. In the Mountain, Southern Plains, Appalachian, and Northeast regions, about two-thirds of the nonreal estate credit is furnished by banks. In the Southeast and Delta regions, commercial banks furnish only about one-half of the non-real estate credit used by farmers.

In general, the southern regions appear to depend more heavily upon the FHA and PCA's as sources of short-term credit than do other regions of the nation. Moreover, while the banks have increased their proportion nationally from 59 percent in 1940 to 72 percent in 1958, in the southern regions the commercial banks apparently have provided a stable or declining portion of these short-term loans. This suggests that financing from within the region has not been readily available to farmers on terms that were as favorable as those terms available from other lenders.

The discussion of nonreal estate credit only in terms of the major lending institutions leaves one somewhat uneasy. Since 1940, new sources of short-term credit for agriculture have expanded rapidly and we know very little about them. The two sources that are, as yet, largely unmeasured are: (1) dealer credit supplied by the seller of inputs, and (2) credit that may be supplied to farmers who participate in a vertically integrated organization. In many cases the latter may be a form of

dealer credit, but the fact that more than the extension of credit is involved would appear to warrant placing it in a separate class.

Too little is known about either the extent or terms under which these sources of credit are available to farmers. Indications are that the costs of dealer credit are much higher than the costs of nonreal estate credit from the conventional lending institutions. The question arises regarding why farmers appear to be making increased use of such credit.

Numerous factors appear to be involved in the spreading of "vertical integration." The addition of product price stability, guaranteed markets, technical production advice, and many other issues may be as important as the cost and availability of credit to the producer.

In some cases, both dealer credit and vertical integration may tap a source of credit which has generally been unavailable to farmers. Such credit is sometimes furnished by an organization which has access to equity capital markets, often outside the region and outside the farm economy. Thus, integration by a national feed company or a large retail chain may mean that capital is made available to farmers under more satisfactory conditions than would otherwise be possible. This subject is discussed in greater detail in Chapter 8.

Nonreal estate credit is often used to finance new investments in land and buildings. Merchant credit has been used to improve milk houses, build facilities to produce broilers, and in some cases, to build barns. Many of the operating loans of FHA and many of the bank loans not secured by real estate are used for such purposes.

There are several indications that the growth of dealer credit in various forms may be due to the failure of the existing institutional structure to provide adequate credit to farmers for intermediate-term capital. An indication of this may be the aforementioned increase in the use of mortgage credit as a method of financing increases in non-real estate capital. One reason for the increased use of real estate mortgage credit to finance short-term capital is the lower cost and more favorable terms. Another indication is the rise in the use of dealer credit which generally is much more expensive than credit from conventional lending institutions. Even though the credit costs more, the length of the loan offered by dealers and merchants may be more realistic in terms of the use of the capital than is the length of the loan offered by the average commercial bank. In mid-1956 banks charged an average interest rate of 8.3 percent on notes acquired from dealers as compared with an average rate of 6.2 percent for direct loans for these purposes.<sup>7</sup> However, almost two-thirds of the acquired notes had maturities longer than one year, whereas only slightly more than a fourth of the direct loans were written with maturities longer than a year.<sup>8</sup>

It is apparent that commercial banks may have policies regarding

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<sup>7</sup> "Loans to buy farm real estate," *op. cit.*, p. 27.

<sup>8</sup> *Ibid.*, p. 24.

credit for the purchase of intermediate-term capital items which are no longer realistic in terms of the size of such investments and their earning power. The result seems to have been a rapid growth in the use of credit furnished by PCA's, dealers, and other sources which will provide credit with longer maturities than is usually true of commercial banks.

## CREDIT AND SOCIAL CAPITAL FOR AGRICULTURE

Most discussions of the capital and credit structure of agriculture concentrate upon the provision of credit and the accumulation of capital upon individual farm units. However, it is generally agreed that the productivity of individual units is related to the general development of the area in which they are located and that the productivity of an area is partially related to the overhead or community capital available to the community. Among the items that might be included as community capital are schools, hospitals, power generation and transmission facilities, irrigation and flood control facilities, and transportation facilities (cf. Chapters 3, 4, 22, and 23).

Probably the adequacy of private sources of credit to meet the needs of agriculture for community capital can best be assessed by examining the extensive role that government has had to play in the development of such capital. One of the sponsors of this symposium, the Tennessee Valley Authority, represents one of the largest and most comprehensive investments of public capital for such purposes in the history of our nation. That investment in such capital pays in this region is no longer questioned. However, the very fact that only public sources were willing to provide this capital suggests that agriculture in general, and particularly in certain regions, finds that little private credit is available for the development of community capital.

Even the more prosperous agricultural regions had difficulty in obtaining electric power until the Rural Electrification Administration made public credit available. The policy decision was made early that the financing of roads could not depend entirely upon the ability of a region to attract private capital.

Apparently the farm economy has experienced difficulty in obtaining private credit to finance modest-scale irrigation programs. The success of the Farm Security Administration and the Farmers Home Administration with the water facilities loan program suggests that such loans are feasible and sound, yet apparently, few attracted private credit until the advent of the insured loan program.

The author lacks knowledge of data regarding the relative cost and availability of credit to finance hospitals and schools in rural and urban areas. It would not be surprising, however, to find that the cost of such credit was higher for rural areas.

If private credit available to agriculture for the financing of community capital is restricted or the terms are especially unfavorable, we



can expect continued political pressure for the provision of public funds to provide community capital. It is important to our total economy that agriculture be supplied with an adequate amount of community capital on favorable terms, even if it must be supplied by public sources. The rate at which the extreme poverty in agriculture is reduced depends in part upon the ability of the low-income regions to attract community capital to combine with the human resources in these regions. Further discussion of the role of capital and credit in rehabilitating low-income rural areas may be found in Chapters 14, 22, and 23.

### AGRICULTURAL CREDIT AND THE GENERAL ECONOMY

Implicit throughout this discussion has been the assumption that agriculture has become more dependent upon external credit as a source of capital and that this dependence will continue and increase. This assumption is based upon the structural changes in the agricultural industry which have taken place since 1940, and which are still under way. If the assumption is true, what does it mean for agriculture?

If agriculture is going to require increased credit from the non-agricultural economy, it means, among other things, that the credit structure serving agriculture may need substantial revisions. The commercial credit sector of the economy has substantially altered its structure in recent years to serve the new demands for consumer credit to finance the purchase of consumer durables. It now appears possible for persons to buy autos and televisions on credit with a longer maturity than the typical farmer can obtain to purchase a new tractor or combine. As yet, no widespread revision appears to be under way in the credit practices to finance intermediate-term agricultural investments. Murray, Diesslin, and others appraise the adequacy of the credit market and credit institutions serving American agriculture, and adjustments to our present credit system are suggested in Part III.

The need for increased external credit also means that agriculture will be increasingly subject to the effects of general monetary policy upon the availability and cost of credit. Even the cost of credit for government borrowing can change sharply within a short time. We know very little about the impact of general monetary and credit conditions upon agriculture, but there are indications that the "tight money" situation has affected both the availability and cost of agricultural credit (cf. Shepardson's discussion in Chapter 18).

It is not necessarily wrong for the agricultural industry to be subject to general monetary policy. On the other hand, since agriculture sometimes has moved almost countercyclically during two successive business cycles, there is little justification for the application of general monetary policy to agriculture in order to influence the direction of general business activity.

The likelihood of increased reliance upon external credit as a source of capital for agriculture in the decade 1960-70 should mean an

increasing interest by farm leaders, policy makers, and financial institutions serving agriculture in monetary policy and the provision of adequate credit to the agricultural economy. Much more information regarding capital and credit in the farm economy will be required for these groups to develop wise private and public policies.

### NEEDED STATISTICS AND RESEARCH

Perhaps the greatest need is better statistics relating to agricultural capital and credit used by U. S. agriculture. Those who are responsible for such statistics have extended their estimates heroically beyond their basic data, which unfortunately excludes data on some of the important sources of agricultural credit. Thus, we find the estimates on merchant and dealer credit "based on fragmentary data."<sup>9</sup> As yet, an accurate and comprehensive picture of the total farm debt and farm credit structure has never been deemed important enough to warrant inclusion in the Census of Agriculture, which is somewhat striking in view of the detailed information provided on certain other aspects of agriculture.

It is likely that there have been relatively few research analyses of aggregate credit statistics on either a national or regional basis because of the paucity of relevant data. Nothing has been done to determine the national or regional supply and demand for credit in agriculture. Nor do we have any research regarding the impact of changes in general monetary policy upon the supply or price of credit to the farm economy.

Probably the greatest gap of all, in both research and statistics, relates to the growth of community capital and its adequacy in the farm economy. So little is known here that it is difficult to assess the role of credit in providing this capital and impossible to make informed judgments regarding what this role might be or should be.

Increased interest has been shown in research on the productivity of capital on individual farms and the availability of credit to provide such capital. As yet, this research does not appear to have been extended to investigations of the kinds of institutional changes necessary to meet the needs of agriculture. Admittedly, research on institutions tends to involve values and does not allow the researcher the comfort of statistical neutrality, but it has been useful in the past and will probably be so in the future. Tolley presents a more comprehensive discussion of needed research on capital and credit in Chapter 27.

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<sup>9</sup> Balance Sheet of Agriculture, *op. cit.*, p. 2.

## Discussion

### C. E. BISHOP\*

Although Hathaway's presentation contains a great deal of information relative to the changes that have been taking place in capital markets for U. S. agriculture, a number of the details presented are questioned.

Hathaway states that "as long as capital formation in agriculture was largely financed internally, credit conditions in agriculture largely affected income distribution in agriculture." Also, he states that "as capital formation has become more dependent upon external financing, the total productivity of the industry is related to the conditions under which it can obtain credit." Whether the credit conditions affected only income distribution depends upon the adequacy of credit for agricultural growth and development. Even though internal financing may have constituted the major source of capital in agriculture, the fact that credit was not obtained from outside sources may have impeded the general development of agriculture. What his statement really means is that the opportunity for any individual to acquire additional assets depends upon his ability to rent, to save, or to acquire credit. Whether this credit comes from within agriculture or from the outside is largely irrelevant except in the context of capital rationing to agriculture.

Hathaway argues that adequate credit for agriculture is important because it allows farm families to realize any capital gains that may accrue to the owners of agricultural resources. I tend to share this bias, but I do not believe that this is an adequate criterion for making credit available to agriculture. If this position is carried to a logical conclusion, it would mean that no nonfarm families would be permitted to own farm resources.

Our attention is called to the fact that the "annual volume of farm mortgage credit fluctuates rather violently depending on the level of prosperity in agriculture. When agricultural conditions are relatively prosperous, the need for external financing usually declines and the annual volume of mortgage credit declines." This observation is not consistent with the data presented in Table 5.2. There was a consistent increase in farm mortgage debt from 1910 to 1924, and a decrease thereafter until 1946. Then again there was a consistent increase from 1946 through 1958. I doubt seriously that these periods of change in farm mortgage debt are highly correlated with the relative prosperity of agriculture. One might raise the question concerning what should be expected as a logical relation of farm mortgage credit (debt) and movements in farm and nonfarm incomes. Until a logical relation has been "spelled out," it is difficult to appraise observed behavior.

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In Chapter 5 sources of credit were divided into those available to the region from within and outside the region. According to Hathaway's analysis, the Southeast appears to "have an agricultural structure that is not generally able to compete with other regions for major sources of outside capital and credit," although it seems to be able to attract outside nonreal estate capital. Much more information is needed relative to the earnings of capital in various parts of American agriculture before conclusions can be reached relative to the operation of the capital market. It would seem appropriate to draw some attention to a comparison of interest rates among regions and to examine the transfer of resources within agriculture. At one time the pattern of migration within agriculture indicated a substantial flow of farm people from the Midwest into the Southeast, while very few people were moving in the opposite direction. This pattern certainly is not consistent with a low productivity of capital in southeastern agriculture.

Although Chapter 5 was directed primarily to the supply side, this reviewer feels that many of the generalizations made with regard to the use of credit may well be charged to the demand side. Hathaway argues that the low-income regions in agriculture still have difficulty in attracting external credit to provide capital. It is quite conceivable, however, that to a large extent this may be the result of risk aversion and inability to perceive adjustment opportunities, rather than capital rationing.

In his discussion of agricultural credit and the general economy, Hathaway completely disregards consideration of the optimum amount of credit; the question of whether too much credit has been made available to agriculture is not considered. Consideration should have been given to the aggregate effects of increasing the supply of credit.

The most disappointing section of Chapter 5 dealt with "Needed Statistics and Research." In this section Hathaway admonishes us to get more answers by getting better statistics related to agricultural capital and credit used by U. S. agriculture. This reviewer would like to suggest that before we launch a full-scale effort to get more answers, we need a better understanding and agreement concerning what the major credit problems facing agriculture really are. Only after this has been done will we be in position to bring our research resources to bear on these problems and find solutions to them.

#### GLENN E. HEITZ \*

The capital and credit problems in agriculture as referred to by Hathaway present a rather cheerless picture of agriculture. The impression is left that all farmers are pretty much the same, and that they are typified by low incomes, difficulty in making financial progress, and inadequate credit. I find it difficult to accept such a generalized concept of agriculture. While most farmers may have been in this group in 1940 or before, this is no longer true. Agriculture has changed rapidly. The

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\*Director, Cooperative Bank Service, Farm Credit Administration.

agriculture which existed in the past has been replaced by several rather distinct groups of farmers who have differing capital and credit needs.

In dealing with capital and credit problems in agriculture, I think we can distinguish among at least six rather broad groups or categories. One of these groups includes the full-time commercial farmers. In general, farmers in this group have made good financial progress over a period of years. Large amounts of credit are borrowed and repaid by commercial farmers. These farmers produce the greater part of the farm output.

A second important group in agriculture includes the part-time farmers. They have dual sources of both income and credit. They use off-farm income and farm income to supplement each other.

A third category of agriculture which is increasing in importance and which is distinct from other segments of agriculture is timber farming. Capital and credit needs in this field are highly specialized and require long-term funds.

A fourth group in agriculture whose numbers are increasing rapidly are the rural residents. While rural residents have credit needs for consumption purposes, they do not have capital needs for purposes of production. Therefore, they can hardly be classed as part of agriculture in this discussion.

A fifth category that usually is included in agriculture when the term is used loosely consists of the numerous tracts of waste and abandoned land. Such land does not contribute to farm output.

The sixth important group, which rounds out what most of us have in mind when we speak of agriculture, includes the marginal and under-sized farms. Such farms are rather numerous, but they account for only a limited portion of the farm output. This is probably the segment of agriculture to which Hathaway refers when he points to the inadequacy of capital in agriculture and the difficulty in acquiring capital. I am in full agreement that farmers on marginal units should be given all reasonable assistance that will contribute to improvement of their position. The cooperative Farm Credit Banks and Associations make many loans to farmers in this category to assist in improving, adjusting, and enlarging farm units. Loans of this type also are being made by other lenders, such as commercial banks. Many farmers who cannot meet the financial requirements of conventional lenders and who need more supervision and guidance also are being served with loans from the Farmers Home Administration. Problems faced by farmers in this group, however, often lie outside the credit field.

Hathaway refers to the difficulties farmers face in getting control of capital. While difficulties do exist in individual cases, agriculture as a whole has done a fairly good job in assembling the necessary capital and assets. Available data indicate that on the average \$20,650 is invested per worker in agriculture as compared with \$20,400 per worker in industry. Farmers also have a favorable ratio of equity to debt.

Cooperatives having a net worth of \$3.8 billion are owned and controlled by farmers.

The "tight money" situation referred to by Hathaway has certainly affected the cost of funds, but cooperative Farm Credit Banks and Associations have not lessened the availability of funds through their organizations during this period.

Frequently we hear that agricultural lenders are not meeting their full responsibility to farmers. It is sometimes said that lending programs tend to lag and are not progressive. Lenders are partly responsible that such impressions exist, since lenders probably have been spending too much time doing their job and not enough time telling about their accomplishments. The Production Credit Associations are active in making intermediate-term loans to farmers to finance purchases or adjustments requiring payments of 3 to 5 years. About 30 percent of the loans made by the Federal Land Banks is used to finance purchases of equipment and to assist in farm improvements, while 25 percent of such loans is used to purchase farm real estate and 45 percent goes into refinancing and consolidating existing debts. During 1959 the banks for cooperatives advanced almost \$700 million to help finance the marketing and purchasing activities of farmers' cooperatives. Even in the Southeast, which traditionally is considered a capital deficit area, lenders are doing much to aid farmers in making needed adjustments. A study of Land Bank and Production Credit Association financing for the period 1950-54 showed that 45 percent of all farmers in the Southeast were making needed shifts and adjustments. Of those making such adjustments, 76 percent were doing it by using credit.

There are limits to the amount of risk lenders can assume. Varying degrees of risk or loss exist in most loans made by agricultural lenders. It is expected that losses will occur on some loans and that these losses will be offset by favorable experience on other loans. But as lending is expanded to include more and more of the marginal farms where risks are greater and losses are larger, the lender is faced with the question of whether borrowers with sound, productive farming operations should in effect be asked to carry the risks of marginal borrowers. Another question is: How much risk can be taken and how much loss can be absorbed within the concept of lending at reasonable rates of interest?



## **PART II**

# **Changing Capital Structure in Agriculture**

- ▶ **Effects of Technology**
- ▶ **Factor and Product Price Changes**
- ▶ **Vertical Integration**
- ▶ **Role of Farm Family**
- ▶ **Regional Agricultural Adjustments**



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## *Technology and Changes in Capital Structure*

**T**HE STRUCTURE of U. S. agriculture has changed greatly since 1940. An important feature of this structural transformation has been the change in kind and quantity of capital used in farming.

The main purpose of this chapter is to trace the major changes in aggregate use of capital in agriculture since 1940, and to relate these changes to changing technology and economic forces. These developments and relationships for agriculture as a whole will be appraised, and important variations for southeastern agriculture to the extent permitted by available data will be noted.

Attention is focused on the assets of agriculture that contribute directly to farm output. Thus, the value of operators' dwellings and household furnishings, the value of automobiles chargeable to family living, and certain farmer financial assets that are logically included in a balance sheet, are excluded. Productive assets are valued in both 1959 and 1947-49 prices to exclude the effects of price changes, and thus permit comparisons with various measures of annual input and output that are arrived at similarly.

### MAJOR STRUCTURAL CHANGES AND ECONOMIC FORCES AFFECTING USE OF CAPITAL

Two important and interrelated aspects of structural change have had a dominant influence on changes in aggregate kinds and quantities of capital used. These are (1) the substitution of nonfarm inputs for both farm labor and farm land and (2) the marked decrease in number and increase in size of farms.

Two major economic forces are also basic to an understanding of the changes that have occurred in aggregate kinds and quantities of capital used in agriculture. The rising price of labor relative to other inputs, together with the general availability of nonfarm employment opportunities, has influenced greatly the composition of agricultural inputs and the use of capital in farming.

Also, throughout most of the years between 1940 and 1959, farmers had strong economic incentives to adopt improved production practices and lower unit costs of production. These incentives prevailed primarily



because of a continuing reserve of unused technology and favorable price relationships. In the immediate postwar years, cash reserves that were accumulated during World War II were used to replace obsolete and inefficient machines and equipment. New items of equipment flowed from laboratories and assembly lines of the industries that supply agriculture with its working tools. In the late forties, price relationships were especially favorable for adoption of the new techniques, but commercial farmers continued to feel the pressure to further improve their physical plant when prices of farm products declined. Thousands faced the choice of keeping pace with the technological revolution or withdrawing from farming.

### CHANGES IN AGGREGATE USE OF CAPITAL

The value of productive assets used in farming has increased substantially since 1940. Dollar value of assets by January 1, 1959, totaled \$155 billion—four times the value on January 1, 1940. The value of total productive assets showed a fairly steady growth throughout the period (Table 6.1). Farm real estate dominated the capital picture, accounting for 65 percent or more of the value of all assets during each of the periods.

Only the value of farm machines and motor vehicles rose more percentage-wise than did the value of real estate during the two decades. Investment in machines and motor vehicles accounted for 10 percent of the value of all productive assets in 1959, compared with less than 7 percent in 1940-42. The impact of increasing mechanization on the capital structure of agriculture is further emphasized if changes in the composition of livestock inventories are considered. Horses and mules made up a fourth of the value of livestock on farms in 1940, but accounted for less than 2 percent of the inventory value in 1959.

Price changes accounted for more than 80 percent of the rise in value of all productive assets used in agriculture from 1940 to 1959. Changes in price were responsible for almost 90 percent of the increase in value of farm real estate during the period. When productive assets are revalued at 1947-49 prices, an increase of only 25 percent between 1940 and 1959 is indicated (Table 6.2). Farm real estate dominates the capital picture on this basis also, but the percentage increase in the two decades was exceeded by the increase in value of all other capital groups shown except livestock.

Although present estimates show a relatively small increase in the constant-dollar value of land and service buildings, the dominant position of real estate in the total capital picture warrants further attention. A part of the increase in the value of land (1947-49 dollars) between 1940 and 1954 is attributable to the 97-million-acre increase in land counted as "in farms" by the agricultural censuses. This increase in acreage has added about \$4.5 billion (1947-49 dollars), and net investment in service buildings an additional \$4 billion to the volume of

Table 6.1. Productive Assets Used in Agriculture, in Current Prices, United States, Specified Periods, 1940-59

Period	Farm real estate <sup>a</sup>	Livestock	Machinery and motor vehicles <sup>b</sup>	Feed crops inventory	Working capital <sup>c</sup>	Total, excluding real estate	Total
(billion dollars)							
1940-42	29.3	5.8	2.8	2.2	1.5	12.3	41.6
1944-46	46.0	9.5	4.9	4.6	2.8	21.8	67.8
1947-49	61.9	13.2	6.2	5.9	3.9	29.2	91.1
1950-52	73.3	16.5	11.4	5.9	4.5	38.3	111.6
1953-55	83.0	12.6	13.8	6.0	4.7	37.1	120.1
1956-58	95.5	12.0	14.6	5.5	4.6	36.7	132.2
1959	110.8	18.1	15.7	5.9	4.9	44.6	155.4
Composition of assets							
(percent)							
1940-42	70.4	14.0	6.7	5.3	3.6	29.6	100.0
1944-46	67.9	14.0	7.3	6.7	4.1	32.1	100.0
1947-49	67.9	14.5	6.8	6.5	4.3	32.1	100.0
1950-52	65.7	14.8	10.2	5.3	4.0	34.3	100.0
1953-55	69.1	10.5	11.5	5.0	3.9	30.9	100.0
1956-58	72.2	9.1	11.0	4.2	3.5	27.8	100.0
1959	71.3	11.6	10.1	3.8	3.2	28.7	100.0

<sup>a</sup> Excludes value of dwellings.

<sup>b</sup> Excludes 60 percent of value of automobiles.

<sup>c</sup> A portion of total demand deposits held by farmers derived by adjusting the deposits of January 1, 1942, by an index of production costs.

real estate since 1940. These two items together account for the increase of 15 percent since 1940 in the constant-dollar value of land and service buildings.

A sizable but unmeasured net increase in the productive value of land resulted from expenditures for irrigation, drainage, clearing, and other land improvements that contribute to farm output. Capital outlays in 1955 for land and water improvements totaled \$562 million.<sup>1</sup> Expenditures under Soil Conservation Service and Agricultural Conservation Program Service programs for practices that increased the productive value of land have totaled several hundred million dollars annually. Sizable capital outlays under other federal and state

<sup>1</sup> Farmers' Expenditures in 1955, USDA, and Dept. of Commerce, AMS-354, Washington, D. C., Dec., 1959.

Table 6.2. Productive Assets Used in Agriculture, 1947-49 Prices, United States, Specified Periods, 1940-59<sup>a</sup>

Period	Farm real estate	Livestock	Machinery and motor vehicles	Feed crops inventory	Working capital	Total, excluding real estate	Total
(billion dollars)							
1940-42	57.9	13.3	4.4	5.8	2.8	26.3	84.2
1944-46	60.4	15.0	4.4	6.0	4.0	29.4	89.8
1947-49	62.0	13.2	6.2	5.9	4.0	29.3	91.3
1950-52	63.6	13.6	9.5	6.2	4.3	33.6	97.2
1953-55	64.7	14.5	10.7	6.2	4.2	35.6	100.3
1956-58	65.5	14.5	10.4	7.0	4.1	36.0	101.5
1959	65.8	14.8	10.2	8.2	4.1	37.3	103.1
<u>Index numbers, 1940 = 100</u>							
1940-42	101	103	108	104	109	105	102
1944-46	106	116	108	109	155	117	109
1947-49	108	102	149	108	155	117	111
1950-52	111	106	232	113	164	134	118
1953-55	113	112	261	113	163	142	122
1956-58	115	112	254	128	157	143	123
1959	115	115	249	149	158	149	125

<sup>a</sup>See footnotes to Table 6.1.

programs and projects ranging from flood control to highways have added indirectly to the value of farm real estate. If all such investments in land (both private and public), less allowance for depletion and other losses in capital values, could be included, the net increase in the productive value of farm real estate would likely be greater than is indicated by our present estimates.

The quality of other productive assets has also been improved, particularly in the case of machinery, equipment, and livestock (cf. Chapter 7). Constant-dollar valuations fail to reflect adequately these increases in the quality of productive assets. The same limitation applies to the measures of real estate inputs and other production inputs discussed below. The important influence of increases in quality of assets and inputs is reflected, however, when changes in volume of farm output are related to changes in volume of assets and inputs. In most instances, changes in quality are synonymous with advances in technology. Technological improvement, in turn, has been the chief factor in the rise in productivity of assets and inputs.

The most outstanding change in the capital structure of agriculture



has been the great increase in productive assets per farm. From 1940 to 1959, the number of farms decreased by 1.7 million, or 27 percent. This contributed to the large increase in volume of assets per farm (Table 6.3). Although volume of productive assets rose only 25 percent from 1940 to 1959, assets per farm increased more than 70 percent. During the period, the volume of real estate and livestock inventories per farm increased by more than half, feed-crop inventories and working capital doubled, and numbers of machines and motor vehicles more than tripled. In terms of dollars, the increase in assets per farm was substantially greater; by January 1, 1959, the average value of all productive assets per farm exceeded \$33,000, about five and one-half times the average value in 1940.

Table 6.3. Productive Assets Per Farm in 1947-49 Prices, United States, Specified Periods, 1940-59<sup>a</sup>

Period	Farm real estate	Livestock	Machinery and motor vehicles	Feed crops inventory	Working capital	Total, excluding real estate	Total <sup>b</sup>
(dollars)							
1940-42	9,216	2,117	701	923	446	4,187	13,403
1944-46	10,125	2,514	738	1,006	671	4,929	15,054
1947-49	10,691	2,277	1,069	1,017	690	5,053	15,744
1950-52	11,491	2,457	1,716	1,120	777	6,070	17,561
1953-55	12,445	2,789	2,058	1,192	808	6,847	19,292
1956-58	13,483	2,984	2,141	1,441	844	7,410	20,893
1959	14,190	3,192	2,200	1,768	884	8,044	22,234
Index numbers, 1940 = 100							
1940-42	102	104	109	107	109	106	103
1944-46	112	124	114	116	164	125	116
1947-49	119	112	165	117	169	128	121
1950-52	128	121	266	129	190	154	135
1953-55	138	137	319	138	198	173	149
1956-58	150	147	331	166	206	187	161
1959	158	157	341	204	216	203	172

<sup>a</sup>See footnotes to Table 6.1. Numbers of farms used in computing averages are as estimated by the USDA.

<sup>b</sup>These estimates differ slightly from those shown in the Balance Sheet of Agriculture because of downward revisions in the constant-dollar value of farm land and service buildings.

## RELATION OF PRODUCTIVE ASSETS TO INPUT AND OUTPUT

Changes in the volume and composition of the stocks of productive assets on farms have been closely interrelated with the marked changes in the input structure of agriculture.

Farm real estate dominated the asset structure of agriculture from 1940 to 1959, accounting for about two-thirds of the stocks of all productive assets. However, when real estate inputs are considered in relation to all inputs, real estate becomes a relatively minor factor. Real estate input — chiefly the constant-dollar value of interest on investment in real estate and depreciation and repairs of service buildings — accounted for approximately 15 percent of total inputs throughout the period since 1940.<sup>2</sup>

Whereas farm real estate dominated the stocks of productive assets, farm labor dominated the input structure of agriculture. In contrast to real estate, however, the relative importance of farm labor decreased substantially during these two decades. In 1940 farm labor made up more than half (56 percent) of total inputs. By 1958 the proportion had declined to 30 percent.<sup>3</sup>

The data in Table 6.4 indicate a major feature of structural change in agriculture — the substitution of nonfarm inputs for both farm labor and farm land. Inputs of farm labor decreased by almost half since 1940. The absolute volume of real estate inputs showed a moderate increase in contrast to a near doubling in volume of inputs other than labor and real estate.

Changes in stocks of productive assets and in inputs used in agriculture can be contrasted in another important respect. Stocks of all productive assets increased 25 percent from 1940 to 1959, but the decline in labor inputs largely offset the increase in nonreal estate

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<sup>2</sup> The measurement of inputs of real estate is based on the concept of annual flow of real estate services, in contrast to the concept of stock of capital goods used in measuring the volume of real estate. The bulk of the real estate input consists of an interest charge on investment in land and buildings exclusive of operators' dwellings. Such an interest charge was calculated for the average of the period 1947-49. This interest charge was multiplied by an index of the physical volume of real estate (converted to a 1947-49 base) to derive annual charges for the period beginning in 1940. The index used was based chiefly on a series developed by Alvin S. Tostlebe in cooperation with the National Bureau of Economic Research.

Other annual real estate inputs include grazing fees, depreciation, accidental damage, and repairs of service buildings, all expressed in 1947-49 dollars.

Real estate inputs measured in this way increased 7 percent from 1940 to 1956-58. This contrasts with an increase during the same period of 15 percent in the 1947-49 dollar value of real estate assets. The difference in rate of change in real estate assets and inputs is due partly to differences in concepts of the two measures. The major difference, however, arises from revisions in the estimates of value of land and service buildings in 1947-49 dollars.

If the revised estimates of the constant-dollar value of real estate presented in this chapter had been used in the input calculations, inputs of real estate would have risen from 1940 to 1958 by 12 instead of 7 percent. However, the revised estimates of real estate input would change the index of total production inputs for 1958 by less than 1 percent.

<sup>3</sup> The data on farm inputs presented here and elsewhere in this chapter are taken from R. A. Loomis and G. T. Barton, *Productivity of Agriculture, United States, 1870-1958*, USDA Tech. Bul. (In press.)

Table 6.4. Inputs Used in Agriculture, United States, Specified Periods, 1940-59<sup>a</sup>

Period	Farm labor	Real estate <sup>b</sup>	Power and machinery	Feed, seed, and livestock purchases <sup>c</sup>	Fertilizer	Miscellaneous	Total, excluding farm labor and real estate	Total
<u>Index numbers, 1940 = 100<sup>a</sup></u>								
1940-42	100	99	106	110	110	101	105	101
1944-46	93	96	129	152	170	104	124	103
1947-49	82	102	172	159	208	107	143	103
1950-52	73	106	217	172	266	119	169	106
1953-55	65	108	233	184	313	126	180	105
1956-58	56	107	237	211	338	134	192	104
1959	54	d	d	d	d	d	d	d

<sup>a</sup>1947-49 price weights were used in combining inputs. The concept of flow of resource services is used in calculating the input measures; this contrasts with the "stock" concept used in measuring value and volume of productive assets.

<sup>b</sup>The index of inputs of real estate differs from the index of capital stock of real estate shown in other tables. The two measures differ in concept and also in other respects described in a text footnote.

<sup>c</sup>Excludes value of interfarm transactions.

<sup>d</sup>Not available.

capital and other nonfarm inputs, thus resulting in little change in total inputs over the period.

Resource adjustment, technology, and other structural changes have brought about significant changes in productivity of the assets and inputs used in agriculture. Volume of farm output rose by more than 50 percent in the two decades following 1940. As the volume of productive assets used in agriculture increased by a smaller proportion and the total quantity of inputs changed relatively little, average productivity of total assets and inputs rose significantly over the period (Table 6.5).

Output per unit of total productive assets increased by more than one-fifth from 1940 to 1959. Volume of nonreal estate assets increased in about the same proportion as output. The process of combining an increased quantity of other assets with a relatively fixed amount of real estate contributed to the rise in average productivity of all assets.

Gains in productivity per unit of total inputs were even more striking. By 1956-58 output per unit of total inputs was almost 40 percent larger than in 1940. Shifts in the composition of inputs, advances in technology and other structural changes, including a large increase in average size of farms, combined to bring about this substantial gain in resource efficiency.

#### Substitution of Nonfarm Inputs for Farm Labor and Farm Land

The growing importance of nonfarm inputs in agricultural production and their impact on the capital structure and productivity of agriculture merits further appraisal and analysis. The rapid substitution



Table 6.5. Average Productivity of Assets and of Inputs Used in Agriculture, United States, Specified Periods, 1940-59

Period	Farm output per unit of						
	Productive assets <sup>a</sup>			Inputs			
	Real estate	Other	Total	Farm labor	Real estate	Other	Total
Index numbers, 1940 = 100							
1940-42	106	102	104	107	108	102	105
1944-46	111	100	108	127	123	95	115
1947-49	113	105	110	149	119	85	118
1950-52	115	95	108	175	120	76	120
1953-55	119	95	110	209	125	75	128
1956-58	125	100	116	255	134	75	138
1959	132	102	122	281	b	b	b

<sup>a</sup>Based on 1947-49 prices. See footnotes, Table 6.1.

<sup>b</sup>Not available.

of capital and nonfarm inputs for farm labor was perhaps the most outstanding change in agriculture during the two decades.

The volume of total productive assets per man-hour of farm labor used in 1959 was more than twice as great as in 1940. Similar increases occurred in real estate assets and livestock inventories per man-hour. Stocks of machinery and motor vehicles per man-hour were more than four and one-half times as great at the end of the 20-year period as at the beginning.

A similar picture prevails when the various categories of inputs are related to man-hours of farm labor. The volume of all inputs other than farm labor and real estate used per man-hour in 1956-58 was almost three and one-half times the amount used per man-hour in 1940. Especially noteworthy were the increases in inputs of fertilizer and lime, and in the amount of mechanical power and machinery per man-hour.

Farmers responded to some powerful economic incentives in substituting capital and nonfarm inputs for labor. Throughout the two decades, a substantial differential between farm and nonfarm earnings persisted (Table 6.6). This economic "pull," plus the existence of nonfarm employment opportunities throughout most of the period, resulted in a large migration of workers from farm to nonfarm jobs. An important corollary development was a sharp rise in farm wage rates to a level in 1959 more than four and one-half times that of 1940.

The rise in the price of labor from 1940 to 1959 was substantially greater than that for any other input (Table 6.6). This encouraged farmers to substitute capital and other inputs for labor. The decline in

Table 6.6. Relative Prices of Farm Labor, and Related Data, United States, Specified Periods, 1940-59

Period	Ratio of farm to nonfarm income per capita <sup>a</sup>	Prices received by farmers	Parity ratio	Ratio of farm wage rates to prices paid for			
				Motor vehicles	Farm machinery	Fertilizer	Real estate per acre
Index numbers, 1940 = 100							
	(percent)						
1940-42	43	128	115	118	123	122	122
1944-46	56	213	136	208	239	228	167
1947-49	58	271	134	187	214	226	162
1950-52	54	283	127	173	188	235	150
1953-55	48	244	109	180	193	246	146
1956-58	47	238	103	178	192	275	142
1959	b	240	100	180	193	303	136

<sup>a</sup> Based on incomes from all sources.<sup>b</sup> Not available.

the general level of prices received and in the parity ratio during the period had little effect upon the pace at which other inputs were substituted for farm labor. The continued high relative price of labor and a continuing reserve of unused technology enabled farmers to lower unit production costs on their own farms by replacing labor with capital and other inputs. This means of lowering costs was available to farmers as individuals and was subject to their decisions, but owing to the economic structure of agriculture, an individual farmer cannot affect prices received for his commodities through his own production decisions. The adjustments in resource use made by farmers in their efforts to lower costs generally, also increased volume of output (cf. Chapter 10). The aggregate effect of this was to lower prices received during much of the post-World War II period.

The large decline in number of farms and the sharp increase in average size of farms were directly related to the substitution of capital and nonfarm inputs for farm labor and farm land (cf. Chapter 7). Moreover, the need for adjusting farm size to the changing requirements for assets and inputs had an important influence on real estate values. With a fixed supply of operator and family labor and a growing stock of machines and mechanical power, some farmers found it possible to reduce unit costs of production substantially through enlarging their farms by renting and buying land. This demand for land for farm enlargement contributed significantly to the rise in value of real estate per acre, particularly after the end of World War II.

In one important respect, real estate is unique among the various productive assets and inputs used in agriculture. Although demand for farm land for nonfarm uses and purchases by nonfarm residents are important in many areas, the value of farm real estate is determined largely by forces within agriculture itself. Except for purchased feed, seed, and livestock, prices of other productive assets and inputs

(including labor) used in agriculture are determined mainly in the non-farm sector of the economy.

The rise in the market value of farm real estate per acre rivaled the increase in wage rates over the 20-year period under consideration. By 1959 per-acre values were three and one-half times the 1940 level. As a consequence, the price of real estate increased relative to the prices of most other assets and inputs except labor. The increase in relative price of real estate thus provided an economic incentive for substituting other assets and nonfarm inputs for farm land, as well as for farm labor. Other productive assets, except total livestock, increased relative to farm real estate. The same relationship exists when the various categories of inputs other than labor are compared with real estate. Especially impressive is the rapid increase in the quantity of fertilizer and lime used per unit of farm real estate.

### CHANGES IN THE CAPITAL STRUCTURE OF SOUTHERN AGRICULTURE

Many of the economic forces responsible for changes in the capital structure of agriculture in the nation also have been present in the South.<sup>4</sup> There are several changes that are either unique to the southern region or that have occurred at slower or faster rates than elsewhere. Major shifts in land use are perhaps the most striking. In contrast to the national picture of little change in total acreage of cropland, the Southeast shows a decline since 1940 of about a third — the Appalachian region, a fourth. Despite the sharp trend away from crop production and an increase in output of livestock and livestock products, the increase in total farm output has lagged behind the national trend (cf. Chapter 1).

The tenfold increase in the value of machinery and equipment in the two southern regions since 1940 documents the conversion from horse and mule to mechanical power that had largely occurred in most other regions a decade or so earlier. This delayed process of mechanization, together with the sharp decline in acreage of crops requiring a great deal of labor, contributed to somewhat greater reductions in labor inputs in the two regions than in other regions.

Another basic characteristic of southern farms has been their small acreages and low capital investments in both land and nonland resources (cf. Chapter 14). Before mechanization occurred, land was by far the major item of productive capital in the South, and it still accounts for about 70 percent of total assets — about the same as for the nation. Although asset values per farm have risen sharply under the combined effect of fewer and larger farms, more assets, and rising

<sup>4</sup> Two production regions — the Appalachian and the Southeast — are included in the statistical analysis that follows. The former region includes Virginia, West Virginia, North Carolina, and Tennessee; the latter includes South Carolina, Georgia, Florida, and Alabama. The terms "South" and "southern regions" refer to both regions collectively.



prices per unit, productive assets per farm in the South are still less than half the national average (Table 6.7).

Part-time, residential, and other noncommercial farms represent a substantially greater proportion of all farms in the South than in most other regions. The inclusion of such farms in the "all farm" totals distorts comparisons with other regions and with national averages. Values of real estate are affected most because of the relatively high per-acre value of noncommercial farms. More than a fifth of the total value of farm land and buildings in the two southern regions was included in part-time and residential farms in 1954. Nationally, the proportion was about 10 percent, but nearly a third of this was

Table 6.7. Selected Measures of Capital Investments, United States, Appalachian Region, and Southeast, Specified Periods, 1940-59

Area and period	Productive assets <sup>a</sup> (current dollars)			Productive assets <sup>b</sup> (1947-49 dollars)	
	Per farm	Per dollar net income	Per dollar <sup>c</sup> labor input	Per farm	Per man-hour of labor
(dollars)					
United States					
1940-42	6,628	5.92	7.56	13,403	4.13
1947-49	15,734	5.90	7.71	15,744	5.45
1953-55	23,102	9.58	11.10	19,292	7.57
1956-58	27,281	10.55	12.93	20,893	8.80
1959	33,455	13.16	14.26	22,234	9.33
Appalachian					
1940-42	3,129	4.50	6.73	6,578	2.50
1947-49	7,109	4.48	5.67	7,113	2.87
1953-55	9,450	5.75	7.56	7,952	4.19
1956-58	10,994	6.88	9.05	8,624	5.46
1959	13,028	8.10	d	9,365	d
Southeast					
1940-42	2,762	4.15	4.71	5,218	2.23
1947-49	6,596	4.39	4.96	6,589	3.53
1953-55	10,845	6.00	8.12	8,893	6.49
1956-58	14,479	7.65	11.52	10,106	9.15
1959	18,590	8.72	d	11,184	d

<sup>a</sup> Market value of farm land and service buildings (March 1), inventory values (January 1) of machinery and equipment (less family share of automobiles), live-stock, feed crops stored on farms, and working capital.

<sup>b</sup> Each class of asset was revalued in terms of 1947-49 prices.

<sup>c</sup> Market value of labor input was derived by multiplying total man-hours by the average cash wage rate per hour for hired labor (without room and board).

<sup>d</sup> Not available.

concentrated in the South. Estimates of nonreal estate capital are probably not distorted as much by the inclusion of noncommercial farms, but total investments per farm for the commercial group would be substantially higher than are shown by the averages for all farms. However, the rates of change may not be affected this greatly because noncommercial farms have remained about the same proportion of all farms over time.

The estimates of productive assets in both current and constant dollars calculated for the Appalachian region and the Southeast are reasonably comparable with the national estimates discussed earlier in this chapter. Valuations of nonreal estate assets in 1959 dollars were converted to 1947-49 dollars by applying the same changes in prices that were used in calculating the national series. The regional or state indices of average value of farm real estate per acre were used to deflate the 1959 dollar valuations of land and service buildings in each of these regions. Changes shown in the constant-dollar valuations are assumed to reflect primarily changes in the physical quantities of productive assets.

Changes in the value of productive assets for the Southeast are influenced strongly by the inclusion of Florida in the region. Market values of farm real estate have increased more in Florida than in any other state, and between 1940 and 1954 about 10 million acres were added to land in farms. The remaining three states (Alabama, Georgia, and South Carolina) showed an increase of only 800,000 acres. A part of the increase in market values per acre in Florida can be attributed to the substantial increases in citrus acreage, improved pasture, drainage, and land-clearing that represent real gain in productive assets. However, as a result of the rapid growth in population and expectations of future growth, market values also have been strongly influenced by nonfarm demands. Although trends in values of nonreal estate assets are similar to those shown by other states in the region, when possible, Florida was excluded from the estimates for the Southeast.

### Changes in Real Estate and Nonreal Estate Assets

As at the national level, land and service buildings in each of the two southern regions represented about 70 percent of the total productive assets of the regions in 1959. Although between 1940 and 1950 the value of real estate in the South did not rise as much as did values of nonreal estate assets, real estate increased more than have other assets in the late 1950's. Within the nonreal estate group, machinery, motor vehicles, and livestock showed the largest gains.

Increases in the value of livestock were substantially greater in the two southern regions than in the country as a whole from 1940 through 1950-52, but both regions showed declines from 1950-52 to 1956-58 (Tables 6.8 and 6.9). Estimates for 1959, however, indicated a sharper increase in these two regions since 1956-58 than nationally.

Table 6.8. Appalachian Region: Productive Assets Used in Agriculture, in Current Prices, Specified Periods, 1940-59<sup>a</sup>

Period	Farm real estate	Livestock	Machinery and motor vehicles	Feed crop inventory	Working capital	Total, excluding real estate	Total, all assets
(million dollars)							
1940-42	2,538	457	150	201	124	932	3,470
1944-46	3,799	717	280	392	209	1,598	5,399
1947-49	5,226	954	446	484	289	2,173	7,399
1950-52	5,928	1,093	908	463	339	2,803	8,731
1953-55	6,295	815	1,140	346	369	2,670	8,965
1956-58	7,036	789	1,228	359	358	2,734	9,770
1959	7,907	1,127	1,331	372	370	3,200	11,107
Index numbers, 1940 = 100							
1940-42	103	106	109	128	113	111	105
1944-46	154	166	204	250	190	191	164
1947-49	212	220	326	308	263	260	224
1950-52	241	252	663	295	308	335	265
1953-55	256	188	832	220	335	319	272
1956-58	286	182	896	229	325	327	296
1959	321	260	972	237	336	382	337

<sup>a</sup> See footnote a, Table 6.7.

Total investment at current prices in 1956-58 amounted to about \$11,000 per farm in the Appalachian region and \$14,500 in the Southeast, compared with the national average of \$27,300. Further increases in market values of both real estate and nonreal estate capital items since 1956-58 have raised average investments per farm to about \$13,000 in the Appalachian region and \$18,600 in the Southeast.

A revaluation of assets in 1947-49 dollars shows that most of the gains occurred in the nonreal estate sector. The constant-dollar value of real estate declined 10 percent in the Appalachian region between 1940 and 1956-58, but increased nearly 50 percent in the Southeast, chiefly because of Florida (Tables 6.10 and 6.11). If an adjustment is made for the atypical acreage change in that state, the real increase in real estate for the Southeast is only about 10 percent.

Between 1940 and 1956-58, the volume of nonreal estate assets increased by about 50 percent in the Appalachian region and 72 percent in the Southeast, compared with 42 percent for the nation. On a per-farm basis, the increases were 88 and 127 percent, respectively. Total assets per farm increased by a third in the Appalachian region and



Table 6.9. Southeast Region, Excluding Florida: Productive Assets Used in Agriculture in Current Prices, Specified Periods, 1940-59<sup>a</sup>

Period	Farm real estate	Livestock	Machinery and motor vehicles	Feed crop inventory	Working capital	Total, excluding real estate	Total, all assets
(million dollars)							
1940-42	1,041	232	68	83	68	451	1,492
1944-46	1,630	366	138	179	125	808	2,438
1947-49	2,350	426	232	170	166	994	3,344
1950-52	2,687	482	476	169	206	1,333	4,020
1953-55	3,020	385	596	114	241	1,336	4,356
1956-58	3,508	368	652	137	241	1,398	4,906
1959	4,104	543	703	127	250	1,623	5,727
Index numbers, 1940 = 100							
1940-42	106	105	111	124	105	109	107
1944-46	167	165	226	267	192	195	175
1947-49	240	192	380	254	255	240	240
1950-52	275	217	780	252	317	321	289
1953-55	309	173	977	170	371	322	313
1956-58	359	166	1,069	204	371	337	352
1959	420	244	1,152	190	385	391	411

<sup>a</sup> See footnote a, Table 6.7.

almost doubled in the Southeast, compared with a 60 percent increase nationally.

### Capital-Income and Capital-Labor Coefficients

The level of capital investments in relation to net farm income and changes in this relationship over time have meaning with respect to the marginal efficiency of capital and the valuation of assets, particularly real estate. Future adjustments in size of farm and entry into agriculture are affected also by the amounts of capital associated with given levels of net income.

Although throughout the period the amount of investment in productive assets per dollar of net income has remained a little lower in the South than in the nation as a whole, both show a substantial increase since 1947-49. In 1940-42 and 1947-49, about \$6 of capital was associated with a dollar of net income nationally, compared with about \$4.50 in each of the southern regions (Tables 6.12 and 6.13). By

Table 6.10. Appalachian Region: Productive Assets Used in Agriculture, in 1947-49 Prices, Specified Periods, 1940-59<sup>a</sup>

Period	Farm real estate	Livestock	Machinery and motor vehicles	Feed crop inventory	Working capital	Total, excluding real estate	Total
(million dollars)							
1940-42	5,521	781	241	534	226	1,782	7,303
1944-46	5,308	871	252	528	288	1,939	7,247
1947-49	5,226	957	438	500	288	2,183	7,409
1950-52	5,156	1,091	756	502	308	2,657	7,813
1953-55	4,996	986	884	363	315	2,548	7,544
1956-58	5,086	950	874	464	300	2,588	7,674
1959	5,004	1,297	864	524	296	2,981	7,985
Index numbers, 1940 = 100							
1940-42	99	93	107	116	107	102	100
1944-46	95	104	112	114	136	112	99
1947-49	93	114	194	108	136	126	101
1950-52	92	130	336	109	145	153	106
1953-55	89	118	393	78	148	146	102
1956-58	91	114	388	105	142	149	104
1959	89	155	384	113	140	172	109

<sup>a</sup> See footnote a, Table 6.7.

1956-58 the capital-income ratio had increased to about \$10.50 for the country as a whole, and to about \$7 in the South. Ratios for 1959 showed a further increase, chiefly because the value of real estate continued to rise while farm income declined.

Productive assets may be related also to the market value and the physical quantity of the labor input.<sup>5</sup> If current-dollar values of assets are divided by the market value of the labor input, the resulting measure retains changes in both quantities and prices of assets and labor. The increase in capital investment per dollar of labor input provides further evidence of the extent to which capital has been substituted for labor. The capital-labor ratio calculated in this way can aid also in projecting possible future capital requirements under varying assumptions as to trends in wage rates and labor requirements.

About \$7.50 of productive assets was associated with a dollar input of farm labor in 1940-42 nationally, about \$6.75 in the Appalachian

<sup>5</sup> Total man-hours used in farm production were multiplied by the cash wage rate per hour for hired farm workers (without room and board) to obtain the market value of the labor input.

Table 6.11. Southeast Region: Productive Assets Used in Agriculture in 1947-49 Prices, Specified Periods, 1940-59<sup>a</sup>

	Farm real estate						Southeast region	
	Alabama, South Carolina, Georgia	Florida	Livestock	Machinery and motor vehicles	Feed crop inventory	Working capital	Total, excluding real estate	Total, all assets
Period								
(million dollars)								
1940-42	2,183	545	437	143	232	168	980	3,708
1944-46	2,241	708	532	159	251	242	1,184	4,133
1947-49	2,349	802	527	277	182	224	1,210	4,361
1950-52	2,420	917	660	476	189	253	1,578	4,915
1953-55	2,350	1,125	653	556	126	285	1,620	5,095
1956-58	2,398	1,258	629	560	190	280	1,659	5,315
1959	2,381	1,261	901	551	238	276	1,966	5,608
Index numbers, 1940 = 100								
1940-42	101	110	94	109	114	101	101	102
1944-46	103	143	114	121	124	145	122	114
1947-49	108	162	113	211	90	134	125	120
1950-52	112	185	142	363	93	151	163	135
1953-55	108	227	140	424	62	171	168	140
1956-58	110	254	135	427	94	168	172	146
1959	110	255	193	421	117	165	203	154

<sup>a</sup>See footnote a, Table 6.7.

region, and only \$4.75 in the Southeast. By 1956-58 the capital investment for the nation had increased to about \$13 per dollar of labor, whereas capital investment for the Appalachian region had increased to only \$9. In percentage terms, these are gains of 70 and 34 percent, respectively. The increase to about \$11.50 in the Southeast is substantially greater (145 percent), but again, it was strongly influenced by the large rise in total value of real estate in Florida. Perhaps the most significant conclusion pertains to the Appalachian region, in which the level of capital appears to be relatively low in relation to the labor input. Despite large absolute increases in total capital, it has not increased as much in this region relative to labor costs as has the national average or the level in the Southeast.

The effects of changes in price are removed if the constant-dollar values of assets are related to man-hours of labor. Investment per hour of labor shows the extent to which physical quantities of productive assets associated with an hour of labor have increased over time. The increases shown by this measure are substantially greater than those shown by the same measure expressed in 1959 dollars because the number of man-hours of labor declined at about the same rate at which wage rates per hour increased. As a result, the market value of the labor input has remained relatively stable since 1950. Thus, the increase in capital investment associated with a dollar of labor input results chiefly from the increases in value of total assets. The increase in quantities of productive assets per man-hour is due primarily to the substantial decline in total man-hours as assets changed relatively little.



Table 6.12. Appalachian Region: Selected Measures of Capital Investments, in Current Prices, Specified Periods, 1940-59<sup>a</sup>

Period	Average investment per farm			Investment per dollar of net income <sup>b</sup>		Investment per dollar of labor input
	Real estate	Nonreal estate	Total	Real estate	Nonreal estate	
(dollars)						
1940-42	2,288	841	3,129	3.31	1.19	6.73
1944-46	3,582	1,508	5,090	2.47	1.04	4.55
1947-49	5,020	2,089	7,109	3.16	1.32	5.67
1950-52	5,896	2,790	8,686	3.40	1.60	6.86
1953-55	6,636	2,814	9,450	4.05	1.71	7.56
1956-58	7,918	3,076	10,994	4.96	1.92	9.05
1959	9,275	3,753	13,028	5.77	2.33	--
<u>Index numbers, 1940 = 100</u>						
1940-42	104	113	106	78	83	91
1944-46	163	202	173	59	73	61
1947-49	229	280	242	75	92	77
1950-52	269	373	295	81	112	93
1953-55	302	377	321	96	120	102
1956-58	361	412	374	118	134	122
1959	423	502	443	137	163	--

<sup>a</sup> See footnote a, Table 6.7.<sup>b</sup> Net income of farm operators, including changes in inventories.

## A LOOK AT THE FUTURE

Further significant changes in the capital structure of agriculture can be expected. Some perspective as to the direction and magnitude of such changes for the nation can be gained (1) by using 1975 as a target date, and (2) by utilizing previous USDA projections of farm output, labor productivity, and number of commercial farms.<sup>6</sup> Using 1957 as a base year, these projections indicate that a needed increase of 40 per cent in farm output could be attained with a third less farm labor. The

<sup>6</sup> G. T. Barton and R. F. Daly, "Prospects for agriculture in a growing economy," in Problems and Policies of American Agriculture, Iowa State University Press, Ames, Iowa, 1959; and K. L. Bachman, "Prospective changes in the structure of farming," paper presented at 36th National Agricultural Outlook Conference, Washington, D. C., Nov. 18, 1958.

Table 6.13. Southeast Region, Excluding Florida: Selected Measures of Capital Investments, Current Prices, Specified Periods, 1940-49<sup>a</sup>

Period	Average investment per farm			Investment per dollar of net income <sup>b</sup>	
	Real estate	Nonreal estate	Total	Real estate	Nonreal estate
(dollars)					
1940-42	1,669	724	2,393	2.59	1.11
1944-46	2,684	1,332	4,016	2.12	1.05
1947-49	3,924	1,660	5,584	2.89	1.19
1950-52	4,826	2,394	7,220	2.98	1.48
1953-55	5,924	2,618	8,542	3.97	1.77
1956-58	7,585	3,021	10,606	5.20	2.08
1959	9,391	3,787	13,178	6.10	2.46
Index numbers, 1940 = 100					
1940-42	107	110	108	88	89
1944-46	173	202	181	72	84
1947-49	252	252	252	98	95
1950-52	310	363	326	101	118
1953-55	381	397	386	135	142
1956-58	488	458	479	176	166
1959	604	574	595	207	197

<sup>a</sup> See footnote a, Table 6.7.<sup>b</sup> Net income of farm operators, including changes in inventories.

projection of number of commercial farms in 1975 is 2 million, a third less than the 3.1 million in 1954.

Underlying these projections is a continuation of past trends in substitution of capital and nonfarm inputs for both farm labor and farm land. These trends and other forces that have affected the capital structure of agriculture since 1940 are expected to continue at least until 1975. Approximately the same asset structure for 1975 emerges by assuming either a continuation of the trend in the total volume and composition of productive assets, or alternatively, a continuation of the trend in productivity of assets which, in turn, is related to the projected increase in volume of farm output. Using 1957 as a base, an increase of 20 percent in volume of total assets is expected. This would be consistent with a rise of 15 percent in real estate assets and about 30 percent in nonreal estate assets. The implied increase in productivity, or of output per unit of total assets, from 1957 to 1975 is more than 15 percent.

Little change in acreage of farm land is anticipated. Rather, the increase of 15 percent in volume of real estate assets is expected to come chiefly from land improvements and net investment in service buildings and other structures. Further additions to stocks of machine and equipment likely will be a dominant factor in the 30 percent rise in nonreal estate assets. Substantial increases in capital of this kind will be needed to help bring about the projected decrease of a third in inputs of farm labor. Increases in size of farms, however, will make possible more efficient use of machines and other capital items, and will thus hold down the rise in volume of aggregate productive assets.

As was true from 1940 to 1959, the most striking future change in capital structure of agriculture is the expected large increase in volume of assets per farm. The extent of this increase will depend greatly on the magnitude of the change in number of farms. Here, inability to separate available basic data on assets, output, and input between commercial and noncommercial farms prevents more meaningful projections.

Bachman has projected the number of commercial farms at 2 million for 1975, compared with 3.1 million in 1954. If we assume no change in number of noncommercial farms between these two dates, the total number of farms would drop by about 15 percent from 1957 to 1975. An alternative assumption is that the number of noncommercial farms will change by the same proportion as commercial farms. This projection calls for a decrease of a third in the total number of farms from 1957 to 1975.

Either projection of number of farms results in a further substantial rise in volume of assets per farm. Productive assets per farm in 1959 totaled more than \$33,000. By 1975 this figure is expected to increase to \$45,000 or \$55,000 (1959 prices). Stated another way, the average volume of assets per farm would rise above the 1959 level by a third under the first assumption regarding farm numbers, and by two-thirds under the second assumption. Assets per commercial farm in 1975 would be considerably higher than at present. The level may be so high that still greater difficulties in financing will arise and accentuate an already important adjustment problem in agriculture.



# Discussion

RAYMOND J. DOLL\*

One of the major problems facing economists since the dawn of their profession has been that of measurement. In Chapter 6 the authors have two major measurement problems. First, how can physical units of inputs be used realistically for comparative purposes through time in an economy that is dominated by rapid technological innovation — particularly when the inputs are not homogeneous either at a given time or through time? Second, how can investment in productive assets used by farmers be adequately distinguished from the cost of inputs per given unit of output for the purpose of analyzing the changing capital structure of agriculture?

The first of these measurement difficulties is always handled by economists in the only way that is available to them — namely, by applying price and converting all inputs into a common denominator. This method, however, has serious limitations which need to be recognized. Scofield and Barton recognize these limitations. Almost everyone recognizes that the general price level changes from time to time and that a dollar's worth of input at one time is not necessarily comparable to a dollar's worth of input at another time. Under these conditions, the solution usually suggested is to convert prices so they are measured in dollars with a constant purchasing power through time.

Unfortunately, the problem is not this simple. A relatively minor problem is that of deciding how the variable prices should be made constant. A more important difficulty, however, is that a physical unit of input in the technology of 1959 is not the same as was a unit similarly identified in the technology of 1940 or 1950. For example, the 1959 gallon of gasoline and tractor or truck are not comparable with the prewar gallon of gasoline, tractor, or truck, and, to the best of my knowledge, there is no way for making these unlike units comparable for comparative purposes.

The second problem of distinguishing between investment in productive assets and the cost of inputs per unit of output also was well handled. This problem has important implications insofar as financing agriculture is concerned. Barton and Scofield emphasize the fact that, even though farm real estate dominates the asset structure of agriculture, real estate inputs, in relation to all inputs, become a relatively minor factor. Thus, much of the financing done in agriculture is real estate financing, even though in terms of inputs it is a minor factor.

A significantly larger proportion of the dollars that farmers used in 1959 for livestock and machinery, compared with 1940, probably

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should be classified as production expenses rather than investment in productive assets. Animal products not only are produced more rapidly, but specialization has tended to cause more steps to be introduced into the productive process and, thus, each farmer handles the livestock for a shorter period of time. In the case of machinery and equipment, specialization and the trend toward larger farms result in more intensive use of the machinery and equipment and also in the use of more machinery and equipment rental and hire. Both of these developments tend to create a need for more operating capital in relation to investment capital.

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## *Farm Use of Capital in Relation to Technical Change and Factor Price*

OUTPUT OF FARM PRODUCTS has been increasing rapidly, at least relative to domestic demand and population growth. Paralleling this growth has been a change in the resource structure of agriculture, particularly in terms of the capital/labor mix of the industry. These and other changes in structure of the industry are simply reflections of changes being made on individual farms. Aggregated, individual farm adjustments in use of labor and capital provide the industry picture. However, the relative magnitude of these changes for the industry are not identical with those of the individual firm or farm which makes the decisions and must acquire the resources to implement these decisions.

Technological change is the "label" or "handy term" used to bring focus upon the changing structure of agriculture. Considered from the standpoint of the economy as a whole, it is technical change and innovation which have made new materials of production possible and available for agriculture (cf. Chapter 1). These changes and innovations have resulted from the application of greater knowledge and skill to the use of our basic resources. The new materials are diverse capital items put to use in agriculture. More of them have been put to use not only because of the capital/product price effect, but also because of their substitution effects or advantages with labor, i.e., because of favorable labor/capital price ratios. Technical discovery or innovation, as much from the industries outside agriculture as from the public research organizations attached to the farming industry, has caused these capital items to be known and made available. However, more directly it has been the relative prices of the capital items representing innovations which have caused them to be adopted and used in greater quantity and to be substituted for other resources, such as labor.

The majority of important innovations in agriculture are reflected in a material or resource. These materials are classified in the aggregate category of capital, e.g., fertilizer, petroleum, power units, improved seeds, insecticides, feed additives, and other chemical, biological, and mechanical items. Each is a material which must be used before the innovation or technique is adopted. The material or capital item almost always has a price attached to it. The number of innovations available to the firm in agriculture, which are not reflected in a



material or resource, and hence, a price, are few and relatively unimportant. Planting seed at one time rather than another (e.g., potatoes in the light of the moon) would be an example, although even then opportunity costs in use of labor and other capital items are sometimes involved.

Knowledge of innovations is necessary before they and the resources or capital they represent are put into use in farming. But knowledge alone does not cause them to be adopted. Few people in agriculture innovate purely for the sake of innovation. The majority of, or almost all, farmers use a new capital resource (and the innovation or technical change it represents) because of the prospective profit increment from using it. The net return or profit from using it depends upon the price of the material or resource relative to (1) the price of the product which it produces, (2) the price of other resources for which it substitutes, and (3) its productivity. The underlying reason for the rapid technical advance in U. S. agriculture, and the parallel trend in output, is basically this pricing structure rather than purely scientific discovery or the sociological explanation of the diffusion of ideas and knowledge.

In order to explain changes in the resource structure and the demand of farmers and the corresponding requirements in capital, we need to explore both the relative prices and productivity of materials representing new technology. We also need to explore the nature of scale or cost economies associated with many of them. This complex of phenomena may make tremendous changes in the capital requirements of individual farms without making similar changes in aggregate capital use by the industry because of a reduction in number of farmers. Given a series of new technologies with high physical productivity and scale or cost economies and a price framework favoring their adoption, against a backdrop of inelastic demands for farm products, individual farmers can be expected to increase the use of capital inputs. Scale can be expected to increase, and while labor on individual farms may remain constant or decline only slightly, total farm numbers and labor employed will decrease—against a food demand which is fairly constant relative to population. Considering the complex of economic factors mentioned above, the use of capital items will increase much more rapidly among individual farms than it will within the agricultural industry as a whole. An individual farmer with the ability to reduce unit costs and increase his total profit (without the two necessarily occurring simultaneously) from use of a specified capital item can expand scale against an elastic demand for its products. But the industry must expand against an inelastic demand. Hence, an “economic dampener” restrains use of resources by the industry, but does not exercise a similar degree of restraint upon individual farmers.

Capital requirements and credit use per farm will undoubtedly increase markedly in the 1960's and 1970's, but capital use by the agricultural industry will not show a parallel rate of increase. For this reason, financing problems of individual farmers will grow in magnitude

if adjustments (encouraged by current or prospective price relationships and changes in resource productivities generated by new technology) in the industry are to be realized. The basis for this differential change will be explained in this chapter. Also, some of the changes in the credit structure which may be necessary to allow these adjustments in resource mixes of individual farms relative to the industry will be discussed.

### DIFFERENCES IN FARM AND INDUSTRY

The relative difference between individual farm increase and industry increase in the use of capital is indicated in Table 7.1. Estimating the total capital used in farming presents some problems of

Table 7.1. Value of Farm Assets, United States  
and Per Farm Average, 1940-58

Year	U.S. (Current dollars in billions)	Per farm	
		Current dollars	1947-49 dollars
1940	53.0	6,094	13,118
1941	55.1	6,340	13,444
1942	62.5	7,449	14,076
1943	73.3	8,934	14,748
1944	83.8	10,328	15,042
1945	93.1	11,346	15,100
1946	102.0	12,435	15,151
1947	113.9	14,154	15,364
1948	125.2	15,906	15,509
1949	132.1	17,144	16,480
1950	130.8	16,979	16,979
1951	149.6	20,434	17,742
1952	165.6	23,206	18,428
1953	162.9	22,946	19,009
1954	159.7	22,592	19,631
1955	164.7	23,806	20,287
1956	168.3	25,096	21,091
1957	176.4	27,203	22,499
1958	186.4	29,600	22,042

Source: Agricultural Outlook Charts, USDA, Washington, D. C., 1960.

measurement and aggregation, especially because of the many new forms of capital. However, these empirical problems are unimportant for the comparisons being made; namely, the differential trends in individual farm and industry use of capital. The industry increase in assets over the period was about threefold; the individual farm increase was almost fivefold. These figures even underestimate the relatively greater growth in individual farm (as compared with industry) use of capital since they are for all farms. Growth in magnitude of capital input has been faster for commercial farms than for all farms.

Table 7.2. Comparison of Inputs, 1937-41 and 1958, for Specified Types of Farms in the United States

Type of farm and location	Land (acres)		Labor (days)		Nonreal estate capital (dollars)		Power and machinery (index, 1947-49=100)	
	1937-41	1958	1937-41	1958	1937-41	1958	1937-41	1958
Cotton:								
So. Piedmont	158	183	526	370	1,010	3,120	54	142
Black Prairie, Tex.	140	185	475	315	1,580	5,130	61	118
High Plains, Tex.	258	404	431	320	2,530	8,140	78	128
Delta (small)	53*	58	375*	274	1,540*	3,640	100*	241
Peanut-cotton	122*	163	404*	332	1,820*	4,000	100*	353
Poultry:								
New Jersey	10*	10	590	590	8,840	9,170	100*	160
Corn Belt:								
Hog-dairy	155	166	507	435	4,690	1,910	69	120
Hog-beef cow	181	240	328	1,347	3,540	14,080	70	130
Hog-steer	178	208	425	403	6,280	22,530	71	117
Cash-grain	209	234	380	329	4,910	17,560	69	112
Dairy farms:								
Central northeast	176	217	533	433	4,100	16,200	75	163
Eastern Wisconsin	115	133	578	435	3,720	15,410	62	146
Southern Minnesota	135	156	482	393	3,460	15,030	56	136
Tobacco:								
Kentucky	110	118	438	391	1,540	5,390	70	171
Coastal plain (large)	170*	170	1,084*	851	6,630*	7,830	100*	103
Coastal plain (small)	50*	50	381*	320	1,900*	2,060	100*	100
Wheat:								
Northern plains (stock)	497	705	340	291	3,420	18,960	51	132
Northern plains (corn)	427	506	374	388	3,220	21,940	44	134
Southern plains	586	732	272	312	2,860	13,140	57	125
Washington (pea)	416	555	389	349	6,600	29,270	73	135
Ranches:								
Northern plains (cattle)	3,322	4,240	412	388	9,090	26,260	65	118
Inter mtn. (cattle)	1,573	1,725	487	499	14,050	45,310	84	127
Southwest (cattle)	8,316*	11,090	395	337	26,460	28,100	100	133
Northern plains (sheep)	4,721	6,298	657	805	10,500	35,380	58	112

Source: Farm Costs and Returns, USDA Agr. Info. Bul. 176, Washington, D. C., Revised, 1959.

\*1947-49 (1937-41 not available).

The rapid increase in commercial farm capital input is suggested in Table 7.2 for typical family-operated units. In addition to the increase in nonreal estate capital, the value of land investment has increased greatly because of (a) larger farms and (b) higher land values. The greatest change in capital structure has occurred on larger-than-family farms which have increased especially since 1940. While still a small portion of the total, the increase of these very large farms has been especially encouraged by trends toward greater specialization in production and the advent of machines and equipment of greater capacity requiring larger initial investments and offering scale economies through larger output.

In many regions, land has been especially important in increasing individual farm capital needs because of the expansion in farm size and the continued increase in land values. Under important cost economies associated with modern machinery, the marginal net value returns from acreage added to an existing unit is greater than the return from the



original unit or acreage itself. This is typically true on family farms where (1) a surplus capacity in labor and machinery exists, (2) total fixed costs of this machinery and power must be covered in the original unit and are no greater when acreage is added, and (3) the only added expense, aside from investment in land, of the acreage increment is the direct variable costs. Hence, with a higher net product from added acres, the "expanding farmer" finds that the added acres have more net value to him than his original acreage, which results in a greater demand for land. This, along with the advent of recent machine technology and a general inflation, has caused a significant increase in land values. However, the price of land has not increased as fast relatively as the prices of certain other major inputs and farm products over the past several decades. Hence, farmers have been encouraged to use more of this resource because of relative price ratios.

### Relative Change in Structure — the Farm and the Industry

The change in resource structure of individual farms relative to that of the industry also has been great. Typically, individual farms have increased their total resource inputs since 1940, but the input of capital assets has increased appreciably relative to that of labor. (While labor inputs for the industry declined almost a third between the periods 1930-39 and 1950-58, labor input per farm declined only about 10 percent.<sup>1</sup> Although industry experienced no important change in the acreage of cropland, input per farm increased 40 percent during this period.)

The indices of selected categories of inputs presented in Table 7.3 further emphasize differences in change of resource structure between the industry and the individual farm. Aggregate inputs of the industry increased only 10 percent over the 20-year period, 1930-39 through 1950-58. (While the increase in such forms of capital as fertilizer, machinery, and livestock was large, the decline in labor inputs and the relative constancy of the large input represented by land tempered the aggregate increase.) But, again, because of the decrease in number of farms, especially small farms, total inputs per farm increased 60 percent in this period. Real estate input per farm increased 63 percent by 1958, while the increase for the industry was only 12 percent. On the average, per farm use of inputs such as fertilizer, machinery, feed, and livestock services increased twice as much as industry use of these same inputs. (Between the periods 1930-39 and 1950-58, per farm use of purchased inputs increased 138 percent, whereas the comparable figure for industry was only 60 percent.) (The index of nonpurchased inputs, mainly labor, declined 31 percent for the industry, but only 5 percent for the average farm.)

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<sup>1</sup> The per farm figures are tempered somewhat by the fact that decline in number has been greatest among the size groups securing the smallest amount of land and labor.

Table 7.3. Total U. S. Agricultural Inputs and Inputs Per Farm for Selected Resources and Periods

Item	Aggregate U. S. (millions)				Average per farm			
	1930- 1939	1940- 1949	1950- 1958	1959	1930- 1939	1940- 1949	1950- 1958	1959
Cropland (acre)	477	470	472	470	71.2	78.2	92.6	102.2
All land in farms (acre)	919	1005	1042	1045	137.2	167.5	204.3	227.2
Workers (number)	12.3	10.4	8.5	7.4	1.8	1.7	1.7	1.6
Man-hours used (hr.) <sup>a</sup>	21.7	18.9	13.0	11.1	3239	3150	2549	2413
Aggregate inputs <sup>c</sup>	100	109	111	110 <sup>b</sup>	100	122	146	160 <sup>b</sup>
Farm real estate <sup>c</sup>	100	103	112	112 <sup>b</sup>	100	115	147	163 <sup>b</sup>
Machinery and equipment <sup>c</sup>	100	156	266	274 <sup>b</sup>	100	174	376	399 <sup>b</sup>
Fertilizer and lime <sup>c</sup>	100	248	474	536 <sup>b</sup>	100	278	624	780 <sup>b</sup>
Feed, seed and livestock services <sup>c</sup>	100	205	313	381 <sup>b</sup>	100	229	412	555 <sup>b</sup>
Paid inputs <sup>c</sup>	100	133	160	167 <sup>b</sup>	100	149	238	243 <sup>b</sup>
Unpaid inputs <sup>c</sup>	100	86	71	65 <sup>b</sup>	100	96	94	95 <sup>b</sup>

Source: Economic Report of the President, Washington, D. C., 1960, pp. 104-5.

<sup>a</sup>Billions for the United States.

<sup>b</sup>1958.

<sup>c</sup>Index.

Quite obviously, then, the developing resource, capital, and financial structure of agriculture is not that of the firm in the industry. The trends of 1940 to 1959 will certainly continue for the next two decades, and at an increased rate if relatively full employment and ample employment opportunities are maintained. Continuance of these conditions and increased communication among farm and urban communities will speed up the tempo of occupational and spatial migration, thus providing the opportunity for remaining farms to expand in land input and total capital assets. New technology for agriculture will certainly encourage these trends. But even in the absence of new technology, the full adjustment potential growing out of currently known technology and existing resource prices will directly carry typical farms in the direction emphasized by the data in Table 7.3. Hence, the problem of the individual farmer in supplying his capital needs will indeed be greater than the problem of credit institutions in supplying credit for the agricultural industry.)

### Trends by Farm Types and Location

Trends in use of more resources per farm are universal over the United States. The data in Table 7.2 indicate that typical commercial family farms in various regions used considerably more land and capital, but somewhat less labor in 1958, as compared with the period 1937-41. In most cases, reduction in individual farm labor input on these commercial units was much less than for the agricultural industry. On the average, the increase in nonreal estate capital used for

these typical farms was greater than the national aggregate. The increase in acreage was, of course, much larger than for the industry.

However, the situation varied considerably among types of farms and regions. In general the increase in individual farm use of nonreal estate capital was lower for cotton and tobacco farms in the South than for the Corn Belt and Great Plains farms and ranches. Similarly, typical dairy farms also increased use of nonreal estate capital by a greater proportion than southern cotton and tobacco farms. However, the cotton farms in the Southeast decreased labor inputs by a larger proportion than other types of farms over the nation.

While the increase in capital and land inputs per farm has not been so rapid for farms in the Southeast since 1940, the rate of change may well catch up between 1960 and 1980. Change has been slower in the Southeast because of (1) lower wage rates tending to discourage the substitution of high capacity machinery for labor, (2) the relatively less favorable initial capital position of farmers, (3) poorer school facilities and lack of communication for occupational migration and improved farm management (Chapters 22 and 23), and (4) the tendency of many abandoned farms to move into forestry rather than into the farm consolidation process. If national economic growth continues at a rapid rate, with relatively greater tempo in the Southeast than in the Midwest and Great Plains areas, factor prices will encourage a more rapid substitution of capital for labor. Economic stability and favorable incomes also can encourage a more rapid rate of farm consolidation and enlargement in the future than in the past. However, the rate of increase in land and capital inputs needed per farm must be much more rapid and of greater relative magnitude if the income gap between the Southeast and (a) nonfarm employment and (b) farming elsewhere in the nation is to be closed. The changes needed are large if returns on labor resources especially are to be brought to levels which Americans would currently term "decent" (cf. Chapter 4). While the economic environment will allow these adjustments in the Southeast to be more rapid in the future, lack of capital still stands as a major obstacle to needed increases in land and capital inputs per farm (cf. Chapters 5 and 14).

American society is investing greatly in the economic development of agriculture in other nations where technology is backward and productivity of cultivators is low. This type of investment is good for humanitarian and related reasons. Capital and managerial ability are the scarce resources in these segments of society, and they must be extended. However, we should muster our national pride and, through proper public mechanisms, provide means of getting the necessary capital and other resources to individual farm units in the Southeast. The gap between agricultural technology and productivity of farm labor in this area, as compared with other farming regions of the United States, is comparatively as great as that among nations if we weigh the present Southeast situation within a society (and not separated by thousands of miles of water or attached to an undeveloped economy) where affluency in living standards and income is greater than in any other nation.



## Product and Resource Prices

( From 1950 to 1959, total agricultural output increased faster than growth in the market. Farm commodity prices were depressed enough to more than offset inflation and the rise in the general price level.) While commodity prices declined, prices of all inputs increased and farm profits in agriculture declined in those 10 years.) In response to this price and income complex, plus the relatively favorable returns to land and transfer of labor to nonfarm uses, capital inputs increased, with land declining slightly and labor declining greatly for the industry as a whole.) Yet the typical agricultural firm increased the total value of inputs as the increase in capital and land submerged the slight decline in labor.) At first glance it would appear that market forces, the prices of commodities relative to the prices of resources particularly, would cause the industry and firm to move in the same direction.) Or, (with scale economies associated with new technology not fully exploited by individual firms, contrasting trends might be expected between the two.) Yet, (other forces bearing on the quantity and mix of resources used by the agricultural firm have resulted in adjustment of the industry in opposite directions.) The remainder of this chapter is concerned with (1) interpreting these forces, and (2) translating their possible effects into capital and credit needs of individual farmers.

FACTORS RELATED TO EXPANSION OF INPUTS  
AND CAPITAL ASSETS OF THE FARM  
RELATIVE TO THE INDUSTRY

The question arises at this point as to why individual farmers use much more capital assets—the several types of resources representing new technology and land—when prices of products are on the depressed side and the industry as a whole has made large reductions in labor inputs, small reductions in land inputs, and only modest increases in physical capital or nonland input. The major explanations are: (1) the financial or equity position of farmers in postwar periods and their greater ability to purchase resources and cope with the risks and uncertainties surrounding greater use of purchased inputs; (2) the nature of scale returns, the cost advantages of larger size and volume, attached to new technology; and (3) the prices of resources representing new technology relative to each other and relative to the substitutability and productivity of these factors.

## The Asset or Financial Position

(Farmers in general have not used resources and assets to the extent postulated in static economic theory.) Under static conditions they would use labor and land in their various quantities and the many capital

items representing various technologies to the point where the marginal productivity of each resource item would be equal to the price ratio formed by dividing the price of each resource by the price of the product which it produces. Historically, farmers have financed their operations on an equity basis (cf. Chapter 12). Given their owned assets, on which credit is supported, they have been limited in purchased assets or resources by (1) amounts of credit loaning firms would provide them, or (2) restraints in credit growing out of their own risk aversions. Elements of these limitations on capital and resource use are discussed in detail in Parts III and IV. Consequently, except in periods of price recession when commodity prices have fallen sharply relative to the prices or costs of resources, the static equilibrium condition of "resource used until marginal productivity falls to the price ratio" has not generally prevailed. The productivity has exceeded the price ratio, particularly for capital items. However, with a growth in income and savings during prosperous periods for the farm industry—such as 1940-54—the individual farm entrepreneur has both (1) more funds with which to purchase capital items and the services of resources generally and (2) a larger equity base for borrowing funds and increasing use of capital or other resources.

Inflation also provided a capital gain which increased equity for purchasing added resources (including credit) as indicated in Table 7.4. While farmers on the average held debts at a lower level relative to assets in postwar periods, they had a much greater absolute asset base on which to borrow. Given encouragement for large units and greater resource employment from other forces, the credit base would appear to exist for further extension in individual farm use of resources. Of course, an important portion of this credit base will disappear as farm operators retire. This is the group which especially benefited from an appreciation in asset values, or capital gains, from general inflation. Much of this type of capital gain will not exist for beginning operators who must buy farms, except as they operate under family partnerships and related arrangements.

#### Industry and Farm Differences Under Capital Limitations and Profit Depression

We now illustrate how an individual farmer who can acquire needed resources because of capital gains through inflation or larger income and savings can profit by increasing resources while prices and returns to the industry in total decline.<sup>2</sup> To do so, we resort to some simple algebra assuming a single product, a given demand situation, and two resources used in production. The demand equation is (1), where the price elasticity,  $b$ , is less than 1.0.

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<sup>2</sup> He may also acquire more resources through integration or other new credit institutions (cf. Chapter 8).

Table 7.4. Changes in Asset and Debt Structure, U. S. Agriculture, 1940-59

Year	Value of farm assets (current dollars)	Farm debt	Debt as percent of assets	Value of physical assets (1947-49 dollars)		
				Real estate	Non-real estate	Total
	(billion dollars)		(percent)		(billion dollars)	
1940	53.0	9.6	18.1			
1941	55.1	9.8	17.8			
1942	62.5	9.9	15.8			
1943	73.3	9.2	12.6			
1944	83.8	8.3	9.9			
1945	93.1	7.6	8.2			
1946	102.0	7.7	7.5			
1947	113.9	8.4	7.4	72.4	27.5	99.9
1948	125.2	9.2	7.3	73.2	26.9	100.1
1949	132.1	10.2	7.7	74.0	31.1	105.1
1950	130.8	10.8	8.3	74.8	32.2	107.4
1951	149.6	12.3	8.2	75.5	33.7	109.2
1952	165.6	14.0	8.5	76.1	35.0	111.1
1953	162.9	14.9	9.1	76.8	36.0	112.8
1954	159.7	14.8	9.3	77.5	37.4	114.9
1955	164.7	15.6	9.5	78.0	38.1	116.1
1956	168.3	17.0	10.1	78.4	38.1	116.5
1957	176.4	17.9	10.1	78.8	36.7	115.5
1958	186.4	19.0	10.2	79.2	37.9	116.1
1959	203.1	20.8	10.2	79.4	39.7	119.1
1960						

Source: Agricultural Outlook Charts, USDA, Washington, D. C., 1960.

$$(1) \quad Q_d = ap^{-b}$$

In this function,  $Q_d$  is quantity,  $a$  is a constant to reflect other parameters (population, income, etc.), while  $p$  is price of the commodity. The individual farm's production function is

$$(2) \quad Q_f = cX^r Z^s, \text{ where}$$

$Q_f$  is the quantity produced,  $c$  is an expression of the level of technology,  $X$  and  $Z$  are magnitudes of inputs of two factors, while  $r$  and  $s$  are the production coefficients or elasticities.<sup>3</sup> Both  $r$  and  $s$  are assumed to be less than 1.0, but their sum is not necessarily so. There are  $n$  farms, and the industry production function is (3).

$$(3) \quad Q_n = ncX^r Z^s$$

<sup>3</sup> In order to retain simplicity, no attempt is made to introduce added variables into the production function to represent new technology. While this would be realistic, it simply adds to the "same general direction" illustrated without this step.



The power function is used to keep the illustration simple and manageable. While it is known that farmers are price responsive, it is assumed that output is limited to the resources used in two periods and that farmers can use more in the second period because of acquisition through savings or a greater credit base.

Market demand and supply are equal for the industry under the conditions of (4). Price, then, is that of (5).

$$(4) \quad ncX^r Z^s = ap^{-b}$$

$$(5) \quad p = \left( \frac{a}{ncX^r Z^s} \right)^{\frac{1}{b}}$$

The total value product, TVP, equation under this ultra-short-run equilibrium is (6).

$$(6) \quad TVP = pncX^r Z^s = \left( \frac{a}{ncX^r Z^s} \right)^{\frac{1}{b}} ncX^r Z^s = \frac{a^m}{n^w c^w X^v Z^e}$$

TVP will decline with the magnitudes of inputs and outputs under the inelastic demand situation.<sup>4</sup> From (6), the equations of marginal value productivity for the industry in (7) and (8) are derived.

$$(7) \quad \frac{\delta (TVP)}{\delta X} = \frac{-va^m}{n^w c^w X^{v-1} Z^e}$$

$$(8) \quad \frac{\delta (TVP)}{\delta Z} = \frac{-ea^m}{n^w c^w X^v Z^{e-1}}$$

Obviously, from (6), (7), and (8), if the industry of farmers increases inputs and outputs, net revenue will decline (marginal value productivities are negative) if the resources have prices of zero or greater. If non-zero and positive prices of  $p_x$  and  $p_z$  for the two resources are assumed, this is still true for the industry but the outcome for the individual farm operator is different. Let us suppose, as originally, that equity financing and risk aversion or credit rationing has restrained his purchase of resources to such an extent that their marginal products are greater than the two price ratios  $\frac{p}{p_x}$  and  $\frac{p}{p_z}$ . Many experimental production function studies, linear programming, budgeting

<sup>4</sup> In deriving (6), the price,  $p$ , is substituted from (5) into the total value function. Since  $b$  is less than 1.0,  $\frac{1}{b} = m$  is greater than 1.0. The exponent of  $n$  and  $c$  is  $1 - m = w$ , a negative quantity in the numerator since  $m$  is greater than 1.0. The exponents for  $X$  and  $Z$  are, respectively,  $r(1-m) = v$ ,  $s(1-m) = e$ , and are both negative, when expressed in the numerator, because  $m$  is greater than 1 and  $1-m = w$  is negative.

analyses, and farm record summaries show that the marginal returns on individual classes of resources have been much greater than their costs to individual farmers in postwar years. Even during the period of decline in feed grain prices, Iowa studies show that the return from fertilizer, at the rate farmers typically were using this resource, was over twice the cost of this resource. The same situation will be found elsewhere over the nation if economic analysis is applied to fertilizer response data.

Because of its atomistic nature, the demand for the product of the individual farm is infinite at a constant product price of  $p$ . Hence, the total value product for the individual farmers is that in (9) while the marginal value products of resources are those in (10) and (11).

$$(9) \quad TVP = pcX^r Z^s$$

$$(10) \quad \frac{\delta (TVP)}{\delta X} = rpcX^{r-1} Z^s$$

$$(11) \quad \frac{\delta (TVP)}{\delta Z} = spcX^r Z^{s-1}$$

The total value product and the marginal value productivities for the individual are not necessarily negative from the outset, as they are for the industry. Given a sufficient degree of capital limitations, the quantities in (10) and (11) will be larger than  $p_x$  and  $p_z$ , the factor prices, for the individual farmer. If excess of income over expenditures and capital appreciation due to inflation provide an individual farmer with added funds or credit base for purchasing resources beyond the original restraint levels, he can profitably add resources, with the industry doing likewise, but with price and aggregate net income declining as long as the quantities in (10) and (11) are greater than  $p_x$  and  $p_z$ , respectively. This condition does not hold for the industry because, even with a zero price for resources, net return would decline and marginal value productivities would be negative.

For an important portion of the period following 1940, farmers used a big part of their increased incomes to pay off debts. But even so, individual farmers still had savings for purchase of more resources. Also, a smaller percentage debt on greater total assets still allowed a greater dollar or absolute amount of borrowing. While total inputs of the agricultural industry increased only modestly over the period 1940-59 under these conditions, individual farm use of resources rose sharply. This differential change was possible because farmers remaining in the industry were in an advantageous resource purchasing position. They were able to acquire some resources formerly controlled by persons less well situated economically who migrated to improve their income position. Also, more resources in total were used because price conditions were favorable.

In the foregoing analysis, only one relationship was examined, viz.,

the use of more resources by individual farmers in a depressed industry, without regard to ranges of increasing scale returns. The purpose was to illustrate that in an industry where greater inputs and outputs cause aggregate income to decline, individual farmers, previously limited in resource quantity by capital limitations, can still purchase more inputs and increase income. But to do so, they must increase their output by a larger percentage than the decline in price, and/or attain certain other cost economies. Farmers who cannot do so are confronted with depressed incomes and with the alternatives of (1) increasing resources used (if they can do so with marginal value productivity of the resources remaining above the price per unit of the resources) or (2) leaving agriculture. Many have followed the latter course.

Industry net farm income has declined even while industry inputs were increasing (Table 7.5). Since there are fewer farms, average income per farm has not fallen by as great a percentage. Even then, income differs greatly among farms. Individual farmers who increased inputs by the largest proportions and changed to profitable new technologies have partly offset the decline in prices by greater volume and lower unit costs. Some have increased their income while average income per farm declined. Other farmers have experienced a sharp decline in income because capital and other forces have restrained their use of more resources and new technologies.

### Scale Returns and Cost Economies

*Individual farm increases resources*

Generally, the opportunity for individual farmers to increase their use of resources, expand output, and increase profits (or keep profits from declining when returns to the industry are depressed from greater output) rests on (1) increasing scale returns or cost economies associated with the prevailing or potential technology, and/or (2) the relation of input prices to product prices. The first consideration will be discussed, although the two are not unrelated.

"On-the-farm scale returns or cost economies arise mainly from mechanical innovations such as those relating to power, machinery, equipment, and buildings. They are only slightly, or not at all, related to such biological innovations as new seed varieties, fertilizer, insecticides, and chemicals. Power units, field machines and harvesters of greater capacity, and larger crop-handling equipment have particularly increased the size or acreage range over which declining per unit costs prevail in cotton, corn, wheat, and other field crops. Also, the greater capacity and productivity of these machines has substantially increased the number of acres, animals, and birds which can be handled by one man or the farm family. Since the fixed costs of these high-capacity machines are greater than those of machines used prior to World War II, the curve of per unit costs declines more sharply over larger outputs. A greater gain in net returns per unit is thus realized as size increases. For the same reason, the economic disadvantage applies



Table 7.5. Farm Numbers, Income, Employment, and Indices of Input and Output, 1940-58

Year	Net farm income (billion dollars)	Number of farms (million)	Operator's income per farm (dollars)	Number persons employed in agriculture (million)	Index of total in-puts in agriculture (1947-49=100)	Index of total inputs per farm (1947-49=100)	Index of total output in agriculture (1947-49=100)	Index of total output per farm (1947-49=100)
1940	4.3	6.4	675	11.0	89	81	75	69
1941	6.2	6.3	978	10.7	89	82	78	76
1942	8.8	6.2	1423	10.5	94	83	90	84
1943	11.9	6.1	1950	10.4	96	92	89	90
1944	12.2	6.0	2035	10.2	97	94	94	95
1945	12.9	6.0	2154	10.0	96	93	92	90
1946	15.2	5.9	2569	10.3	97	96	96	95
1947	17.3	5.9	2947	10.4	98	97	94	96
1948	16.1	5.8	2767	10.4	100	100	104	100
1949	13.8	5.7	2410	10.0	102	104	103	106
1950	13.2	5.6	2334	9.3	104	109	104	113
1951	15.2	5.5	2739	9.0	109	115	109	115
1952	14.4	5.4	2659	8.7	111	119	115	128
1953	13.9	5.3	2619	8.6	112	122	119	131
1954	12.2	5.2	2346	8.5	114	127	122	136
1955	11.5	5.1	2255	8.1	116	132	129	147
1956	12.0	5.0	2421	7.7	119	138	133	155
1957	11.0	4.9	2269	7.4	119	142	136	162
1958	13.1	4.7	2767	7.2	123	150	151	185

Source: Agricultural Outlook Charts, USDA, Washington, D. C., 1956 and 1960.

more acutely to farms of small acreage. In days of horse power, the important cost economies had been attained by the typical 160-acre Corn Belt farm. Based on the machine technology prevailing in the Corn Belt during the early postwar period, however, studies showed that per acre and per unit costs of production declined quite sharply up to 240 crop acres.<sup>5</sup> Costs per unit declined beyond this point, but the rate of decline was much less and probably insufficient to overcome uncertainty and related investment phenomena in conditioning choices in farm size.<sup>6</sup> In a later study, cost functions were analyzed for later types of power units and machines, including picker-shellers.<sup>7</sup> With the great capacity and costs of power units and field machines, we find that the rate of decline in per unit (acre) costs of crop production is as great at 320 acres as it was at 240 acres in former studies. To an important extent, this same relative change in cost functions has been taking place in other geographic regions and for other agricultural products. It is true for the tractor (as compared with the mule) technology of cotton production in the Southeast, and particularly for cotton and vegetable production in the West, where the capacity and purchase price of machines has increased but the marginal rate of substitution of machinery for labor has increased even more. It is also true in wheat production where larger power units and machines have extended the acreage over which the rate of decline in per acre costs is large. Newer building facilities, feed, and milk-handling equipment have had a similar effect in extending the scale over which costs decline in dairying. Newly developed techniques of housing and feed handling in pork, poultry, and beef production appear to have a similar effect in giving rise to a cost curve which declines over a greater number of animals and birds.

These developing machine technologies increase the demand for, or use of, several types of capital. First, the investment in machinery and equipment itself is increased. But since the main cost advantages of these newer machines are realized only if their higher fixed costs are spread over more acres or animals, the latter categories of capital must be increased and the investment is augmented accordingly. In numerous types of production, investment in the added land or livestock inputs is greater than the increase in machine investment. For example, an increase from 160 to 240 acres, or from 200 acres to 320 acres, in north central Iowa or central Illinois can result in the use of an added \$30,000 in land, an amount greater than the incremental machine investment for handling the larger acreage. The same general

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<sup>5</sup> Earl O. Heady, Dean McKee, and C. B. Haver, *Farm Size Adjustments in Iowa and Cost Economies in Crop Production for Farms of Different Sizes*, Iowa Agr. Exp. Sta. Bul. 428, May, 1955.

<sup>6</sup> On an acreage basis (but not necessarily on a per unit of product basis), per unit costs decline and approach the mathematical limit of the variable costs,  $V$ , per acre as denoted in the equation  $A = FN^{-1} + V$  where  $A$  is average cost per acre,  $F$  is total fixed cost, and  $N$  is the number of acres.

<sup>7</sup> Ronald Dean Krenz, *Farm Size and Costs in Relation to Farm Machinery Technology*, unpublished Ph.D. thesis, Iowa State Univ., Ames, Iowa, 1959.

relationship is also true for shifting from a conventional cattle feeding operation to a highly specialized one with more animals, or in enlarging a dairy herd to realize lower costs associated with recent developments in housing and feed and milk handling.

However, increase in scale is not determined alone by fixed costs and the rate and extent of decline in unit costs associated with changing machine technology. It depends also upon (1) relative changes in the marginal rate of substitution between machine capital and labor, and (2) the relative prices of these two categories of input. Unless relative changes in these two magnitudes were favorable to shifts in resource inputs and structure of the type mentioned previously, the basis of agricultural production would remain more in the direction of labor with less economic premium on larger units and greater investment. The rate at which machine capital substitutes for labor, relative to the unit price of services of these two factors, does increase with scale of operations under the range of machine types and sizes available and in prospect.<sup>8</sup> This increase in substitution rate itself causes more machinery to be substituted for labor in the aggregate in agriculture, with investment in inputs increasing accordingly.

If humans were capital assets, as they were in days of older institutions, the substitution of machinery for labor would cause an investment to increase less rapidly than is the case. A laborer is not an asset which can be purchased or sold in the market. Only the services of the laborer in a particular period can be purchased. In contrast, however, a machine is a capital asset. Its entire stock of service is purchased in the price of the asset. For this reason, as machine capital is substituted for labor, capital investment increases by a greater proportion than costs are reduced in a single production period.

These several considerations relating to machine technology will cause capital requirements of the individual farm to continue to grow in the 1960-69 decade. In the Corn Belt, for example, the most predominant size of farm is 160 acres, a size smaller than necessary for full realization of cost economies. This situation is paralleled in wheat areas and other regions. Capital per farm will be increased as much by investment in the added acres, animals, and birds to complement newer machine technology as in the machines per se. Also, there will be continued economic pressure for the individual farm family to either (1) cease farming operations or (2) expand scale to realize incomes comparable with wage earners and businesses in the nonfarm sector. With continued economic growth and relative premiums on product prices and resource returns in nonfood sectors of the economy, the small farm with a low capital investment will continue to disappear (cf. Chapters 1 and 14). The operator will shift to nonfarm employment where returns to his labor resources are greater than returns from farming, or he will remain in agriculture but will extend his investment

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<sup>8</sup> Earl O. Heady, *Economics of Agricultural Production and Resource Use*, Prentice Hall, New York, N. Y., 1952, p. 192.



and output to reduce unit costs and increase the rate of return to his resources. This shift is, of course, taking place. It will continue at a somewhat gradual rate with no extreme revolution in farm size and numbers within a particular period—such as a year.

### FACTOR PRICES AND SUBSTITUTION RATES

One relationship between new machine technology and increased capital demand by the individual farm is reflected in the farm's cost curve or structure. However, the magnitude of machine prices relative to the prices of other resources and to farm products is an important causal factor determining the amount of this specific form of capital which is used in agriculture. Relative changes in the rate of substitution of machinery for other resources also are important in this respect. Rather than discuss machinery alone within this framework, attention is directed toward capital resources in general. Resources such as fertilizer, feed additives, improved seeds, and others have been used in increased quantities mainly because they have been priced favorably relative to the prices of farm products, and because their marginal productivities have increased as a result of technological changes. Within this favorable environment, scale or cost economies have had little, if any, relationship to increased demand for such "biological" resources.

For the individual farm, capital items such as fertilizer, insecticides, fuel, seeds, etc., serve generally as complements with land. As more acres are operated, additional quantities of the capital items also are used. Similarly, as the number of animals and birds handled increases, the amount of feed and livestock services also increases. Technically, of course, other capital inputs can serve as substitutes for land and livestock, even for an individual farmer. He can produce a given output, for example, with more fertilizer and less land or vice versa. But in general practice and because of favorable price relationships, he either uses more fertilizer and other chemicals or inputs on a given acreage or expands their use as he takes on a larger acreage. For the industry, however, fertilizer and similar materials serve more clearly as a substitute for land. With the large increase in fertilizer, insecticides, improved seeds and products of other innovations, the nation's food output can now be produced with fewer acres devoted to the conventional mix of crops. Unfortunately, however, it has not been possible to withdraw or shift the excess land, and surpluses still accumulate. But even if the national input of land were diminished to bring output into line with demand, individual farmers producing the particular commodity would not reduce output (in the absence of "across the board" control programs) but would continue to increase land and associated inputs as long as price and marginal productivities of these resources were favorable relative to the prices of the commodities produced.

Table 7.6. Index of Prices Received and Prices Paid for Selected Inputs, 1935-59 (1935-39=100)

Index of	Period				
	1935-39	1940-44	1945-49	1950-54	1955-59
Prices received by farmers	100	144	231	252	221
Price of fertilizer	100	106	132	150	151
Price of machinery	100	102	130	173	191
Price of labor	100	178	333	395	455
Price of land (alone)	100	112	188	254	325
Price paid, all costs	100	122	184	220	229

Source: Agricultural Outlook Charts, USDA, Washington, D. C., 1960.

The prices of factors used in production and the physical magnitude of their marginal productivities have increased the demand by individual farmers for most major categories of inputs (Table 7.6). This was true even in the late 1950's, when commodity prices were depressed relative to factor prices, generally. If marginal productivities are increased sufficiently through technical innovations, the farmer's demand for inputs can increase even under conditions of declining commodity prices relative to factor prices.

Assuming that  $X_0$  represents the original quantity of the resource,  $X_n$  is the new quantity,  $P_y$  is the price of the product, and  $P_f$  is the price of the factor, nine possible combinations of changes result and are represented by the cells in Table 7.7. The rows represent changes in the magnitude of the factor/product price ratio, while the columns represent changes in magnitude of marginal physical productivity (MPP) of resources. Each cell indicates the expected change in factor demand by the individual farmer. For example, with the MPP and price ratio,  $P_f/P_y$ , both constant, no change would be expected in factor demand (the middle cell of the table). Generally, the first column can be ruled out, except for situations such as extreme soil erosion. The middle column may apply to a few resources where technical innovation has been unimportant, e.g., more so for range resources in the Inter-Mountain region than for farm resources elsewhere in the nation. However, the demand situation for most resources such as land, agricultural chemicals, machinery, livestock, and feed is characterized by the third column. The marginal productivities of the resources have increased due to technical research by the USDA, land-grant colleges,

Table 7.7. Expected Effect of Changes in Price Ratios and Marginal Productivities on Resource Demand

	MPP decrease		MPP constant		MPP increase	
$P_f/P_y$ increase	$X_n$	$X_0$	$X_n$	$X_0$	$X_n$	$X_0$
$P_f/P_y$ constant	$X_n$	$X_0$	$X_n = X_0$		$X_n$	$X_0$
$P_f/P_y$ decrease	$X_n$	$X_0$	$X_n$	$X_0$	$X_n$	$X_0$

private firms, and farmer discovery and management. With the price ratio constant or decreasing, demand by individual farmers for the resources would increase. With the price ratio increasing, demand for resources would be expected to increase or decrease depending on whether the improvement in productivity of the resource is relatively greater or less than the increase in the price ratio. Evidently, for individual farmers in most regions of the country, the marginal physical productivities of resources have increased faster than the factor/product price ratio has declined.

### STRUCTURAL CHANGE IN ASSETS DUE TO CHANGE IN FARM SIZE

If the demand of individual farmers for land to expand size of farms continues to increase, further shifts may be experienced in the make-up of capital resources. Consolidation of farms may dampen the demand for nonreal estate capital, as the increase in demand for some forms of capital is partly or totally offset by decline in other forms. Further study and time are needed to determine the effect of consolidation, farm size increase, and the growth in demand for land by individual farmers on the composition of capital inputs. However, the general current pattern in major crop producing regions appears to be that farms of typical size have underemployed capacity of labor, machinery, and power units. This is true largely because the discrete unit size in which machines are purchased exceeds the capacity needed. As these farms take on additional land, they need not increase their machinery and power proportionately, and sometimes not at all. For instance, if two farms of 160 acres are consolidated, the total machinery investment may well be less than for two separate units. Or, more likely, the total investment in power units and field machinery may be less than previously, while that for feed handling and similar equipment may increase.

Studies of farm consolidation in Iowa show the following effects: Farmers supplying land for farm consolidation generally are those with greatest limitations in capital and, except for retirement and similar reasons, migrate from farming because incomes are unfavorable relative to other opportunities. Using their restricted capital for machinery and operational expenses, they have invested relatively little in fertilizer, improved seed, and livestock. In contrast, those farmers acquiring land through farm consolidation have more capital. As they operate the acreage released by migrating farmers, they use more fertilizer per acre than the previous operator. Evidently, they also produce more livestock on the added unit with the result that livestock capital employed on the consolidated unit exceeds that on the previous two separate units.



CAPITAL INSTITUTIONS IN RELATION TO  
THE FARM-FIRM CAPITAL DEMAND

Given the existing and prospective techniques in agriculture and the relative prices of factors used in production, the individual farm's capital demand or requirement will grow greatly in future years. Even with some further decline in commodity prices relative to factor prices, this will be true because of (1) the larger acreage and animal numbers over which scale or cost economies of machinery and equipment extend, (2) the productivity of many resources, such as chemicals, is still high relative to their costs, and (3) because the suppliers of inputs will increasingly find themselves faced with the need either to increase the productivity of the resource they sell to farmers or to lower its price.<sup>9</sup> Greater knowledge of farm people, better adaptation of vocational and other education to current economic conditions, and improved communication mechanisms for nonfarm employment opportunities also will lead further to a greater average capital input per farm (cf. Chapter 23). Also, the tendency toward increased specialization in farm management, partly as a result of the more complicated technology of production, will favor a greater input and output per farm.

Capital inputs or demand for the individual farm will continue to grow much more rapidly than those for the industry. Growth in individual farm use of capital may well allow returns to resources used in agriculture to compare more favorably with those employed in other industries. But before this structural change is completed in magnitudes which appear necessary, important changes may be needed or required in the capital market and in credit mechanisms if they are acceptable to the American public (cf. Chapters 13 and 15). Obviously a farm unit using \$200,000 or more in capital—an amount appearing consistent with the technology and scale economies now existing in major types of commercial agriculture—will have to surmount important financing problems. Traditionally, the equity base for financing agriculture has come from within the industry, mainly from the families supplying labor to the sector. This situation is not paralleled in other industries where the supply of capital through corporate funds and common stocks is drawn widely from all sectors of the economy and not particularly from the households which supply labor. Typically, farm businesses have been initiated by the family providing the initial assets or credit backing to a son as he starts operations. Inheritances drawn from capital accumulation within agriculture have been the main source of the down payment in purchasing land.

This source of equity base for credit is much less consistent with the technology and capital requirements of 1960 than with those of 1950. The growth of vertical integration in farming may stem as much from

<sup>9</sup> As farmers become even more proficient as managers, materials representing conventional techniques may rapidly come into full use. Further sales of materials will then depend especially upon the ability of supplying firms to produce new materials with a higher marginal productivity than the old, or which are priced lower relative to their productivity.

these developments as from other reasons sometimes mentioned, as presented in Chapter 8. But vertical integration is only one means of gearing institutional and market mechanisms more closely to the modern capital needs. Others need to be investigated. Family corporations may offer promise. Perhaps the entire structure under which credit is provided to agriculture needs to be re-examined. Historically, the farm operator has borrowed funds over and above his inheritance or individual capital accumulation to finance ownership. But he immediately established a goal of 100 percent equity and used his savings for debt retirement. The goal underlying this procedure has been that of security for old age and retirement. The extension of social security coverage to farmers, the growing knowledge of farmers about nonfarm investments, and related developments may remove the pressure for rapid and complete debt retirement. As part of this process, we need to re-examine our credit facilities for agriculture, as is done in Part III. The corporate firm makes no particular effort to liquidate its indebtedness on an amortized basis. Should more credit be extended to agriculture in a similar manner? Farm operators might then utilize their savings where appropriate to extend operations to a scale more consistent with modern technology. Both farm businesses and lending firms may gain, provided the initial loans have an economically substantial base. In the absence of major business recessions and in a stable agriculture, borrowed capital should have no less productivity in the future than in 1959. Why should debt be liquidated if the funds so obtained have a productivity greater than their price? These considerations and related questions need to be examined as we study how individual farms can be better supplied with credit to aid them in bridging the transition from the current structure of agriculture to the one which is in prospect.

Finally, if young farmers are to be given better opportunity for starting, or if established operators are to use the various capital resources, in line with relative prices and productivity, consideration needs to be given methods for extending credit on the basis of capital productivity. Diesslin also argues for this consideration in Chapter 13. Credit on this basis would allow a use of resources more suited to the modern economic structure than to the more conventional security basis. Of course, risks to the lending firm are no less important than risk and uncertainty to the farm firm. However, integrating firms have partly overcome this difficulty by combining management aids or specifications with capital supply. A parallel development is appropriate for other credit institutions and firms.

# Discussion

JOHN BLACKMORE\*

Heady's central thesis is that with a continuation of 1959 trends in agriculture, individual farm demands for capital will grow substantially more than the aggregate demands for capital on the part of the agricultural industry, and that this in turn will create a need for some new kinds of financial structures for farm business and a new orientation for farm lending.

A special commendation is due Professor Heady for his useful addition to the prevailing explanation of adoption of innovations. The sociologists have monopolized the field, and it is helpful to have it pointed out that the ultimate test of acceptance of an innovation is economic in nature. I would expect both the remote Asian farmers and the sophisticated Iowa producer to make some analysis of the economic consequences for the firm as a whole regarding the adoption of an innovation as well as an estimation of the adjustments required in the total process of production, and their costs, output, and income potentials. The lack of knowledge as to how to conduct such a whole-farm economic analysis may well be a major factor in delaying adoption of innovations in farming.

Attention is called to agricultural economists regarding their persistent oversight of the role of fertilizers in modern farming. Heady has done far better than most. Chapter 7 contains significant data relating to this highly strategic element in the agricultural production process. Why are farm economists and agricultural policymakers so preoccupied with the land factor? The sponsors of this symposium have shown great wisdom in attempting to turn attention to the capital factors in agriculture, and Heady's chapter contains many inferences that fertilizers, among all the forms of capital, should have some special attention. Note in Table 7.3 the relative changes in input use. Fertilizers are conspicuously ahead of alternate investments. The price indices presented in Table 7.6 suggest why farmers may have accelerated fertilizer use. Note also Heady's reference to Iowa studies showing that returns to fertilizers were, in typical farm situations, more than double their costs. One might wonder if farmers have not been substantially ahead of their economic advisors here.

In his analysis, Heady makes a special plea for intensifying public efforts to aid in the accelerated redevelopment of farming in the Southeast. He suggests that this region can catch up with the Middle West in the two decades of 1960-79. I do not agree. The process is not one of "catching up" with any other region of the United States. It is one of developing a unique and productive system of farming consistent with the physical and economic environment of the particular section of the

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nation. We should not look especially to the Middle West for a model of the agricultural future for the Southeast. We should, on the other hand, recognize that most of the farms in this area simply have no future as they are now organized. For hints about what the future will look like, this region should examine what has happened over a period of almost one hundred years in New England and what is happening now in Sweden. As in those areas, much land in the Southeast is going back into forestry. Only the most productive soil areas can be expected to remain in agricultural production. In western Massachusetts the rich Connecticut Valley remains in highly productive farms, while in the Berkshires the old stone field fences run through the forest. In 1880, 40 percent of the area of Massachusetts was in improved farm land. In 1959 10 percent is in such use. In New England it was cheap energy and water power that sparked industrial development which in turn has concentrated the human population largely in urban areas. People moved west or moved to town from the hill areas. Cheap energy of another kind is having the same effect in the southeastern region. The growth of the cities and of industry is accompanied by the evolution of a whole new pattern of agriculture. I expect that the surviving commercial farms in the Southeast will be larger and more highly specialized operations making use of large amounts of capital. There is a higher income future for the Southeast. Its main elements will be industry, forests, and large, specialized, heavily capitalized farms.

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## *Vertical Integration As a Source of Capital in Farming*

**L**ENDERS, trade creditors, landlords, partners, and farm operators are the traditional sources of capital used in farming. But we have come to recognize another significant source — business concerns vertically integrated with farm operations. Through vertical arrangements, suppliers, processors, and dealers have put much new capital to work in farming. This, in turn, has stimulated an increase in capital from traditional sources. This chapter is concerned with an examination of this relatively new means of expanding farm capital, how it came about and its implications.

### DEFINITIONS

In this chapter farm capital is defined broadly to include all the financial resources and all the goods and services used in farming except the labor of the operator and his family (Spitze and Raup's definitions in Chapters 2 and 9). Land, buildings, machinery, livestock, supplies, services, and the funds used to buy or hire any of the goods and services used in farm production are considered to be farm capital.

Vertical integration also is a term that is subject to various interpretations, partly because it does not fit in well with an outmoded relatively simplified concept of economic organization. As used in this chapter, vertical integration means the joining together of two or more stages in the vertical chain of production under some form of unified or shared management.

### FORMS OF VERTICAL INTEGRATION

In the Southeast, vertical integration in agriculture has developed in a variety of forms. In some instances, individuals or corporations coordinate production and processing by owning both farms and processing plants, shade tobacco in Georgia and Florida, sugar cane in Florida, cotton in Mississippi, and apples in Virginia. Cooperative activity as a way of integrating production and marketing is important in Florida citrus. Contracts are another means of tying farm production to sources

of supply or to marketing channels. Contracts have existed for some time in potatoes, aromatic tobacco, tung nuts, and certain vegetables. The most dramatic development of vertical integration has occurred in the broiler industry. The current contractual arrangements in egg and hog production in a few areas have been watched with much interest, since the implications are important.

The various forms of vertical integration differ widely with respect to meeting risk, supplying capital, and controlling management in farm production. In this chapter the discussion is limited to contractual arrangements and how they affect the capital position of agriculture. Even among contracts, large differences are found among areas, commodities, and producers. The conclusions herein are focused mainly on contract production of poultry and hogs in the Southeast.

### CONTRACTS AND CAPITAL EXPANSION

Feed and fertilizer firms, hatcheries, canneries, and other suppliers and processors are among those who furnish capital to, and are integrated with, agriculture under contractual arrangements. These businesses, which may be private organizations or cooperative associations of farmers, are usually called contractors or integrators. They provide a variety of operating capital including such items as feed, fertilizer, chicks, pigs, medicine, and equipment. They also furnish a variety of services ranging from general managerial guidance to such specific tasks as pruning, spraying, harvesting, and hauling. Often the contractor retains ownership of the capital he furnishes and becomes a joint enterpriser with, rather than a creditor of, the farmer. This is commonly termed "financing production." The "producer" usually means the operator of the farm, and he may be either an owner or a tenant. However, at times the integrator is more likely to be the real producer — in both the economic and legal sense — if he owns much of the operating capital and exerts a considerable measure of entrepreneurial control.

The land, buildings, equipment, and labor used in contract production are usually provided by the farmer. He may also supply some of the operating capital. The relative amounts of the different resources supplied by the farmer vary with the commodity and the type of contract. If he needs credit for the items he furnishes, he may borrow from commercial banks, insurance companies, Federal Land Banks, production credit associations, or other usual sources. Sometimes a contractor helps a farmer arrange for his credit needs.

Integrators in the Southeast provide substantial financing in some instances.<sup>1</sup> A broiler contract, for example, might provide for \$18,000 worth of feed, chicks, medicine, fuel, litter, and other supplies each

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<sup>1</sup>The estimates of costs used in this section are approximations based on information from published and unpublished sources.



year in a typical operation of four lots of 10,000 birds each. For a 2,000-bird laying flock, the contractor's advances in pullets, feed, and supplies would come to more than \$12,500 a year. The integrator's stake in breeding stock for a 24-sow-and-boar contract would amount to about \$1,700. Frequently, he also provides corn and supplement worth \$6,000 or more annually.

For the farmer, investments needed to meet the contract requirements may include new or remodeled buildings, machinery and equipment, and some of the operating expenses. Cash costs for constructing buildings may be considerably less than the investment value because farmers frequently use their own labor and farm-produced lumber.

The cash investment in a 10,000-bird capacity broiler house might be \$5,000 or more at 1959 cost levels. For a 2,000-bird laying flock, the producer's cash investment in buildings and equipment could be as high as \$4,000. Out-of-pocket expenses for constructing and equipping the pig parlor and farrowing houses needed for a 24-sow contract would amount to \$2,500 or more. The total amount by which the capital investment in these farms has been increased depends on how much additional value is estimated for the farmer's own labor and materials used in the construction.

For contract farms in the aggregate, the authors know of no estimates that indicate the additional capital investment or the increase in the use of operating capital. Some calculations have been made so as to get an idea of the magnitude of these estimates for the southeastern broiler industry. For the greater Southeast, the ten states that lie east of the Mississippi and south of the Ohio and Potomac Rivers were included in the calculations. The broiler houses used in contract production and other forms of vertical production in 1959 were estimated to have a cash investment cost of about \$90 million and a total investment cost of about \$135 million, assuming \$45 million to be the value of the operators' noncash investment. One way of picturing the sheer magnitude of the physical investment is to say that if these houses were laid end to end, they would extend from Knoxville, Tennessee, to Reno, Nevada, with enough left over to go on to Los Angeles. More than four-fifths of the investment in broiler houses has been made since 1950.

The value of feed, chicks, and miscellaneous supplies provided by integrators in 1959 was estimated roughly at \$350 million, about 40 percent of the value of all feed and livestock expenditures in the region. In 1940 the amount of broiler financing by integrators probably was less than \$10 million.

## REASONS FOR CAPITAL EXPANSION

Capital resources in the enterprises mentioned would have expanded somewhat even without contracts. Since 1945 the economy as a whole has been prosperous, and although farm incomes have been less favorable than nonfarm incomes, the level has been sufficiently good to

provide funds for loans and investment. The possibility of increased efficiency through improvements in machinery and equipment has caused capital growth in almost all segments of agriculture (Chapters 6 and 7). In view of the technological innovations in production of broilers and other integrated commodities, it is reasonable to assume that much capital would have been attracted even if contracts had not developed.

If contract farming had not developed, however, the use of capital would have grown at a slower rate, particularly in the Southeast and for low-income farmers. Basic forces that have encouraged the flow of capital to farming through integrated channels have included technological innovations, expansion of production in the feed and fertilizer industries, growth of retail chains, supermarkets, and other means of mass distribution, and the recognized possibilities of profit by integrators.

Of importance is the fact that a contract is often an "open sesame" which unblocks the flow of resources to agriculture. Ordinarily, capital expansion is restricted in several types of situations. These situations are especially prevalent in the South because: (1) some farm operators lack knowledge of profitable investment opportunities or the ability to carry them through (Chapters 14, 21, and 23); (2) some are reluctant to borrow because of uncertain prices or markets — the chance of impairing or losing the equities in their own farms is one they do not wish to take (Chapters 14 and 21); (3) some may be reluctant to borrow because of a misunderstanding about the value of using credit or because they believe it to be morally wrong (Chapter 20); and (4) others may wish to use credit but are turned down by the lender on grounds of risk — usually low management ability or too much uncertainty regarding production or markets (Chapter 13).

A production contract often overcomes these drawbacks to capital investment. The integrator provides a ready-made production program with built-in guidance in new technology and management. He also provides price or income guarantees and access to markets. Financing in the form of supplies provided by the contractor does not create a debt. Consequently, it is not objectionable to farmers who would be reluctant to borrow. Since uncertainties of income are reduced, producers are willing to invest more of their own money and labor. They are also better able to obtain loans from regular lenders to finance buildings, equipment, and miscellaneous operating expenses.

How much the grower's income uncertainty is reduced depends, of course, on the type of production contract. Any kind of stop-loss guarantee eliminates the possibility of negative net cash returns; a straight salary or wage contract eliminates almost all of the uncertainty for the period of the contract; a flat fee per head or per pound limits the uncertainty to the physical hazards.

## UNCERTAINTY AND CAPITAL EXPANSION

The relationship between uncertainty and the investment of capital resources is so important in some instances that the subject deserves special attention. This can be illustrated by referring to the history of commercial broiler production. Here, one of the chief reasons for the development of contractual arrangements was the high degree of uncertainty with respect to financial outcome that faced independent producers. Feed dealers and other integrators were better able to cope with the uncertainties and to continue to supply the necessary resources.

Disease and heavy mortality of birds originally constituted the main source of uncertainty. Even in the late forties, death losses of broilers in Delaware were as high as 40 percent or more for some producers.<sup>2</sup> Since that time, the disease problem has been greatly reduced, and widely fluctuating prices have constituted the major source of uncertainty. In 1959 average weekly prices of broilers in Delaware varied from a low of 14.5 cents per pound to a high of 20.3 cents. An individual broiler producer might be unlucky enough to experience heavy mortality or be obliged to market his birds during a period of low prices. A feed dealer with many flocks under contract is more concerned with average mortality and the average of prices for all lots during the entire year. These averages can be predicted with more certainty than can the production of a particular producer or the price during a particular week.

To illustrate the difference between the way a feed dealer and an independent producer view the uncertainty of mortality in growing broilers, judgment probability curves have been developed for each. These curves are based on data from a study of 180 flocks produced in the last half of 1952 in Delaware.<sup>3</sup> The mortality among these flocks ranged from almost zero to more than 30 percent. This experience indicates that a mortality expectation curve for an individual producer based on that period would be relatively wide and low, skewed to the right, and with a modal frequency of about 6 percent mortality (Figure 8.1). The curve indicates a probability that the mortality would be 10 percent or more in 1 in 4 flocks and that the mortality would be 20 percent or more in 1 in 20 flocks. The chances of experiencing these higher losses, even though small, would influence producers to seek arrangements that would make returns more certain.

In contrast to the producer's situation, a probability curve as viewed by a feed dealer would be high and narrow (Figure 8.1). The uncertainties that confront the individual producer would disappear in the average. The feed dealer is confronted with the uncertainty of the level of the annual average. The average mortality for 180 flocks during the last half of 1952 was 8 percent. In the subsequent three years, the

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<sup>2</sup>W. T. McAllister and R. O. Bausman, Influence of Management Practices on Cost of Producing Broilers in Delaware, Winter 1948-49, Del. Agr. Exp. Sta. Bul. 282, Jan., 1950.

<sup>3</sup>Unpublished data from study reported in Frank D. Hansing, Financing the Production of Broilers in Lower Delaware, Del. Agr. Exp. Sta. Bul. 322, Oct., 1957.



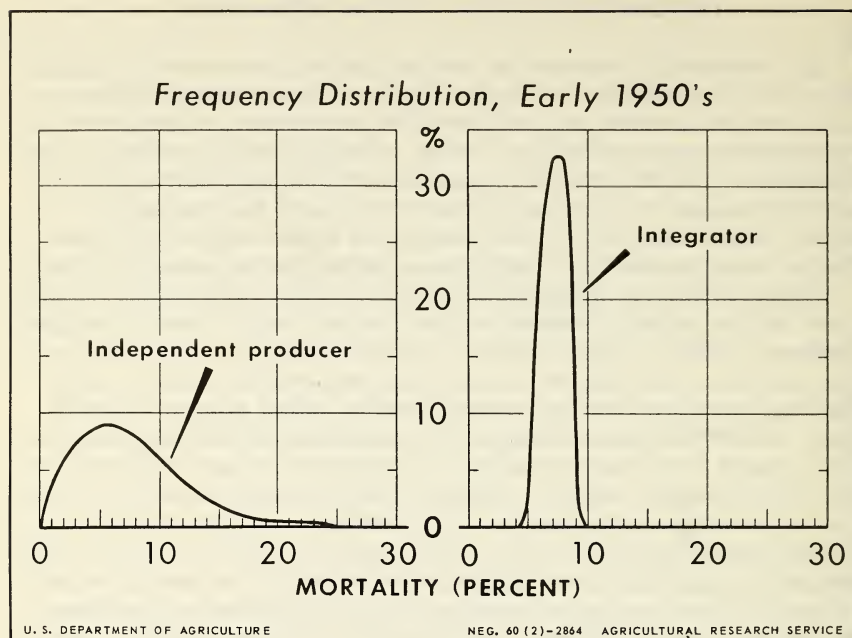


Fig. 8.1. Expected mortality of broilers.

mortality averaged 7.1, 8.0, and 6.2 percent, respectively. This suggests that a dealer with a large number of flocks under contract could have expected with much certainty, at that time, that the average annual mortality would not vary from year to year by more than 2 percentage points. In effect, what was a major uncertainty to each individual producer was converted by the integrator into something more like a smaller calculated risk. A calculated risk is just another cost of doing business.

The differences between individual producers and integrators in ability to cope with fluctuating broiler prices are similar to the differences in meeting the uncertainty of mortality. The farmer who produces four lots of broilers a year must look at the probabilities of marketing his birds at various prices. Using Delmarva weekly price data for 1957, for example, a probability curve was constructed that is slightly rounded and relatively low and wide (Figure 8.2). Average weekly prices ranged from a low of 14.5 to a high of 23.0 cents per pound. The probability of an individual producer marketing his broilers that year at 17 cents or less was the same as the probability of receiving 21.5 cents or more. On the other hand, a feed dealer who keeps up with price trends and operates on a large enough scale to market his broilers continuously throughout the year might have been able to predict his average sales price within 2 or 3 cents (Figure 8.2).

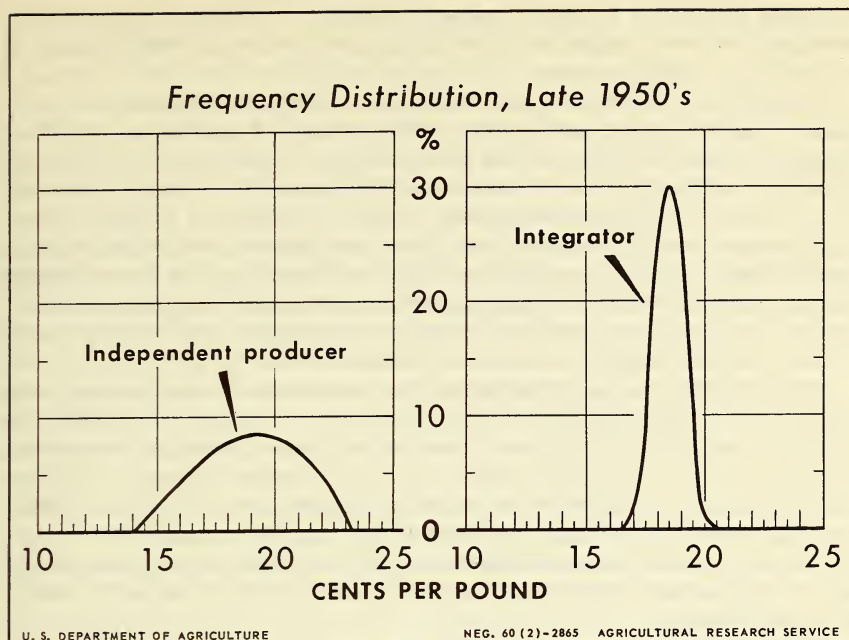


Fig. 8.2. Expected broiler prices.

### IMPERFECTIONS IN THE CAPITAL MARKET

Is contract farming an outgrowth of imperfections in the capital market for agriculture? Admittedly, perfection is unattainable, but one may take as the prototype of one concept the market through which new issues of stocks and bonds are sold. This is an impersonal market including large numbers of new issues and many prospective investors. The capital issues are standardized into homogeneous classes as to type, quality, and denomination. Information about these characteristics and market conditions is widespread. Through changes in supply and demand and the interest rate, this market acts to channel capital from savers and investors to various segments of the economy. Under this concept, emphasis is on the degree of perfection at which the specific market mechanism functions, with little consideration for the need for other institutions.

However, the concern here is with a broader concept which implies that there is some optimum amount of capital or credit that the market should provide to farming (Chapter 3). Is capital as readily available as in other areas and in other industries? Is the supply large enough to employ existing labor resources and promote efficient production? Is the supply of capital sufficiently mobile and are the institutions sufficiently flexible to permit agriculture to adjust to changing conditions?

With this concept of a capital market, the word "adequacy" may be the main point of consideration. Part III is also concerned with the adequacy of the capital market.

The capital market for agriculture obviously has operated neither flexibly nor smoothly, never approaching a state of perfection or adequacy according to either of the two concepts. Information concerning the supply and suppliers of capital and the prospective demand for and users of capital has been imperfect. Lack of uniformity among farms and farmers usually requires that direct investment and loans be handled through individual negotiation. Interest rates tend to be inflexible, lending customs often are rigid, and the conventional institutions that regulate the flow of capital and credit to agriculture are relatively slow in adjusting to changing conditions (Chapters 15-17).

Undoubtedly, the restrictions on the movement of capital funds into agriculture, either through equity investment or through the credit system, have been significant in stimulating the development of contractual arrangements. The capital market for agriculture continues to be far from perfect, but wherever contracts have expanded rapidly the changes have been in the direction of a more perfect market. Suppliers of capital have increased, standardization is more widespread, production is more uniform, and information is more complete with respect to markets and income.

In the sense of adequacy indicated above, the capital market has become more perfect, at least in the short run. Contractual arrangements have met a need, or demand, for capital that is felt by many farmers. They have provided employment for the labor of farmers and have increased their incomes. Both individual and aggregate adjustments probably represent a better use of resources than would otherwise have occurred.

This may be difficult to prove because it is not known what alternatives to contract farming might have evolved. However, it is known that the addition of contract farming to the kit of structural devices makes for more effective treatment of specific problem situations. It is expected that other devices will be developed to reduce uncertainty, provide capital, and accomplish other objectives even more effectively in the future.

## THE PLACE OF SPECIALIZED LENDERS IN CONTRACT FARMING

As contracts multiply and integrators supply increasing amounts of capital, one might well ask about the role of banks, production credit associations, and other specialized lenders in this development. How fundamental are the changes that contract farming has made in the market through which agriculture draws capital and credit?

Crops grown under contract continue to be financed largely by regular lenders. But many farmers operating under livestock contracts are receiving capital through a different set of institutions. Investment



in and retained earnings of agri-business — supply, processing, and marketing organizations — constitute one of the important new sources of funds for farming. Significant changes have occurred also within the more traditional banking and credit system. This system is still the basic source of much of the operating capital used under contracts, but the capital reaches the producer by a roundabout route. For example, city banks make loans to large feed manufacturers who, in turn, extend supply credit to feed dealers. Feed dealers also may borrow money from banks. They are then able to provide “financing” to the producer in the form of chicks, feed, and supplies.<sup>4</sup> When a farmer cooperative is a contractor, the funds may be obtained from one of the Banks for Cooperatives. The contract producer of broilers, eggs, and hogs borrows relatively little from the local country banks or production credit associations except for building construction or the purchase of equipment. The new institutional arrangements are still minor as a source of credit or capital for agriculture as a whole, but are well established in many contract farming situations.

The chief reason why local lenders seldom finance farmers directly for the expense of growing broilers is that operating capital is only one of the requirements. Technology, management supervision, a market for the birds, and a guaranteed minimum return must be provided if the operation is to be economically successful for either the producer or the supplier of capital. These are functions usually considered to be outside the field of credit. In fact, most institutional lenders could not go very far in participating legally in these activities even if they wished to do so.

True, many lenders seem to be moving in the direction of providing more services to farmers. Many banks are hiring trained agricultural men who help farmers plan operations and adjustment programs (Chapters 16 and 18). They may also give suggestions on new technology and markets. In a few instances, production credit associations have gone so far as to team up with cooperatives to provide financing to their contract producers. But even here, most of the functions of the integrator are assumed by the farmer cooperative. Credit is the only service provided by the PCA, and it is partly guaranteed by the cooperative.

Perhaps many feed dealers and processors who operate with contracts would like to transfer the financing to the specialized lenders. But local lenders are unlikely to finance production directly to any great extent through contracts. Such activity, even if permitted by law and regulations, would involve a considerable reorganization of the lending business. Interest rates and other charges would be higher to cover costs of additional services and risks.

Some economists believe that as farmers gain more experience under contracts and improve their financial condition, some of the

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<sup>4</sup> The term “financing” as used here does not mean the extension of credit. Financing is a broad term that implies how the cost of assembling productive resources is met. The cost could be “financed” in various ways — by the producer, by the dealer, by the creditor, etc.

larger-scale operators will become independent producers. In broiler production an appreciable shift could not be expected until the industry reaches a more mature stage of development with more stable product prices. Local lenders might then participate more in financing production, although banks, feed manufacturers, and other centralized sources are likely to continue to provide much of the financing.

### CONTRACTS VERSUS INTEGRATION BY OWNERSHIP

Why do integrators choose contracts as a way to achieve their objectives of selling feed, controlling quality, and scheduling production? These goals might have been attained by ownership or leasing of production facilities. Adoption of the contract method centers around the fact that under this arrangement most of the labor and the fixed capital needed for production—real estate, buildings, and farm equipment—are supplied by the farmer.

In contrast to complete ownership of the facilities, contracts permit greater flexibility in a rapidly developing industry confronted with many uncertainties. A feed dealer can expand his output quickly, even though his assets and borrowing capacity are relatively small. His labor problems are minimized, and he can require the farmer to carry the risk of new investments in specialized buildings and equipment. Some dealers and processors may wish to be ready to move in any of several directions if current production conditions should prove to be temporary. For example, if broiler integrators should be forced to curtail or shift production, they could do so without undue concern over investment tied up in unused housing capacity. Any decline in the value of buildings caused by loss of markets or technological obsolescence would be at the expense of the producer, not the integrator.

Another advantage of contracts is that the producer is frequently able to provide the fixed capital at lower cost than can the integrator. Many farmers in the South are willing to provide their labor in constructing buildings at little cost because its value for alternative uses is low. Similarly, the rate of return that the farmer expects on his real estate, or for timber supplied, may be relatively small. If the integrator were to buy the land and pay the going rates for labor and materials, his costs would be much greater. Thus, production through contracts, rather than through owner integration, has been fostered by the existence of large pools of underemployed labor and other resources that yield low alternative returns and are therefore available for use at relatively low opportunity cost.

### EFFICIENCY OF CAPITAL USED UNDER CONTRACTUAL ARRANGEMENTS

The widespread interest in contract farming is related to the

generally increased productivity of all the resources involved under this method of operation. It is logical to assume that outside capital does not usually seek investment in agriculture unless the investment will yield a return at least equal to the going rate in industry and commerce (Chapter 5). The efficiency occurs in many ways, but mainly through the reduction in uncertainty and the spreading of new technology and improved management. Larger scale production also often reduces costs per unit.

Great gains in efficiency have been made in production of broilers. By introducing improved breeds, better feed and medicine, and increased efficiency of labor and management, contract arrangements have helped to reduce mortality and to increase feed-conversion rates. Better buildings and equipment—including automatic feeders—have helped to increase output per unit of input of capital and labor.

In 1940, 481 feed units were required to produce 100 pounds of broilers.<sup>5</sup> In 1950 the number of feed units declined to 382 units, and by 1958 to 295 units. Improved efficiencies are shown most dramatically by the change in labor used. In the Appalachian region (Virginia, West Virginia, North Carolina, Kentucky, and Tennessee), the index number of production per man-hour of chickens, broilers, and turkeys was 89 in 1940, rising to 104 in 1950, and jumping to 212 in 1958. In the southeastern states (South Carolina, Georgia, Alabama, and Florida), the index in 1958 was 381, more than 4 times the index of 1940 and about 3-1/3 times that of 1950. Production efficiencies have been increased in egg and hog production in many of the same ways, but contracts for these commodities have not expanded as widely as have those for broilers.

Contracts have helped to increase productivity in crop production through integrators supplying fertilizer, high-quality seed, and specialized services such as are needed at times in spraying and harvesting. Contract arrangements often result in less waste and improved quality, with more of the output reaching market channels. Less storage of products is required, and the producer spends less time and effort in marketing.

### IMPACT OF CONTRACTS ON FARMING

Lack of operating funds to make full use of fixed capital and labor is one of the long-standing problems of farmers. Southeastern agriculture probably has made slower progress than other regions in reducing this imbalance. The apparent shortage of capital in agriculture may be due simply to the reluctance of farmers to draw upon available supplies of capital and credit, or to their lack of knowledge as to profitable uses of such resources. In other instances, capital and credit, although

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<sup>5</sup> A feed unit is the equivalent of a pound of corn in feeding value. R. D. Jennings, Consumption of Feed by Livestock, 1909-56, USDA Prod. Res. Rpt. 21, Washington, D. C., 1958.



plentiful in the community, have not been available to producers because of the uncertainties of production and prices. Substantial amounts of capital and labor in the hands of producers have remained partially unemployed as well. The advent of contract farming has altered many of these conditions. It has (1) shown how additional capital could be used, (2) provided new capital, (3) changed the attitude of producers concerning the use of more capital, and (4) reduced the risk or uncertainty of investment of capital for both farmers and integrators.

Contracts bring about higher aggregate production through providing more capital, managerial, and technical services. This in turn affects the prices of farm products. The impact varies among commodities and areas, depending on the kinds and amounts of resources and services supplied. The effect may be offset by the extent to which aggregate production may be controlled, and by related changes in demand. Supply may expand more relative to demand when the main force causing contracts is the desire of industry to sell feed, fertilizer, and other significant capital inputs.

In a period of rapid expansion of contract production, the aggregate effects of increased and more efficient capital may therefore be higher total output and lower prices. The competitive pressure will be felt by higher cost areas and farms. Many independent producers may be forced into contracts if they wish to remain in business. Competition among integrators also increases, resulting in a drive toward lower costs and increased scale of production.

Low prices seem to have placed contract broiler producers in a less favorable income position. Feed dealers are less active in seeking contract producers than in earlier years of broiler history. Production facilities on farms have expanded so greatly that the output capacity of those willing to produce may exceed the demand for broilers at prices that will yield reasonable returns to producers. Many producers will be willing to renew contracts under terms that will not yield a satisfactory wage as well as a return on their fixed capital investment. The bargaining position of many southeastern contract producers may be especially poor because of the few alternatives for profitable use of their capital and labor. Even when alternatives are available, relatively few of these producers would have the knowledge and additional resources needed to take advantage of them.

A report on trends in broiler contracts in Louisiana indicates the economic pressure that producers throughout the Southeast have experienced.<sup>6</sup> From 1954 to mid-1959, payment for broilers produced under the "flat fee" type of contract dropped from a high of 3-1/3 cents to about 1 cent per pound. Under "feed-conversion" plans, the base payment in 1954 was about 2 cents a pound, with a "bonus" of 1 cent if the conversion was at less than 3 pounds of feed per pound of broiler. By mid-1959 these rates had been reduced to provide three-fourths of a

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<sup>6</sup> Paul Roy, "Recent trends in broiler and table egg contracts," Louisiana Rural Econ., Nov., 1959.

cent to 1 cent per pound of broiler plus one-fourth to one-half of a cent bonus if the feed conversion ratio was as good as 2-1/2 to 1.

With regard to contract production of table eggs, Roy reported that the original flat fee of 10 cents per dozen had been reduced by mid-1959 to 6 cents or lower, with 2 cents extra in some instances for the more efficient producers who could meet feed conversion and quality requirements. In the Sand Mountain area of Alabama, the fee paid to contract producers for large or medium eggs dropped from 12 to 6 cents per dozen during the five years preceding 1958, and integrators were offering 4 cents in 1959.<sup>7</sup> Sometimes the contracts included bonus provisions.

The action that integrators may take under increasingly adverse conditions is uncertain. However, contracts have had many modifications and more will undoubtedly come. These changes will have varying effects, but it seems certain that the trends toward larger scale and more efficient output will continue. Another probability is that fewer contracts will be available to producers. Reports in trade journals indicate that feed dealers are becoming more selective and are not renewing contracts with producers who have poor feed-conversion rates. Some dealers are growing more broilers on their own farms. Some are making contracts for only one flock at a time, thus leaving producers with greater uncertainty as to renewal. The 1960's will be a period of adjustment for contract farming and contractual arrangements, especially in production of broilers and table eggs. Before relatively stable conditions are reached, it is expected that there will be much experimentation on the part of both producers and integrators.

The contract producers who should be most concerned are those who exhaust their financial resources for fixed investments in buildings and equipment. The risk is greater if a long-term debt is incurred to expand the investment. If total production rises and prices decline, this additional capital investment may provide improved returns for a relatively short period only. At a minimum, when planning a specialized investment in buildings or equipment to meet contract requirements, the producer should recognize the longer term income uncertainties and the need for a relatively short time schedule in which to depreciate the new capital and repay any added indebtedness.

Another problem, almost unique to the contract method of financing production, concerns the equitable distribution of available returns between integrators and producers. This is a problem that becomes accentuated as the fixed investment of producers becomes larger and their economic position weaker. For dairy and sugar beet production, where contracts have long been used, government market orders and programs have contributed to a stable price situation and equitable sharing between producers and processors. Auctions, which are developing in some areas, will give producers access to markets other than through integrators. In some situations, the best solution may be the

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<sup>7</sup> B. R. Miller and Morris White, *Contracts vs. Independent Egg Production and Marketing*, Ala. Agr. Exp. Sta. Circ. 135, Oct., 1959.

formation of more cooperative marketing associations. In others, the organization of a bargaining association may be the means by which an equitable sharing of costs and returns may be negotiated.

A final comment about contract farming as an innovation may be in order. We must recognize that it is an innovation in the same general sense as a technological or biological innovation. Certain generalizations can be made about the behavior of innovations as a class. These generalizations hold true for both agricultural and nonagricultural industries. Innovations usually involve a growth in investment and productivity and result in basic readjustments within the affected industries. The economy experiences growing pains, and in the short run, some segments may be hurt. But these changes in technology and the resulting shifts of income among individuals and movements of resources from one area to another are the marks of a dynamic and progressive economy. Innovations affect the position and shape of the supply schedules for the affected commodities. For example, the development of hybrid corn brought a shift in the supply schedule for corn. After that, more corn was produced at a given price than formerly. Similarly, the innovation of contract farming in commercial broiler production has caused a shift in the position of the supply schedule for chicken meat. The shape or elasticity of the supply schedule may have changed also. These shifts and changes are in the nature of innovations and the cost of adjustment to them is a part of the cost of progress.

## *Discussion*

### J. WARREN MATHER\*

A comment is warranted on the point made that contractual arrangements have provided much new capital for agriculture. Certainly this is true for the South and for poultry enterprises, but is this the case on a national or aggregate basis? To what extent has the increase in capital in the South been offset by a decline in other areas? This, of course, must be evaluated on a relative basis to take into account the absolute increase in capital in all areas to meet the food needs of an increasing population. It, therefore, seems to me that from the over-all standpoint of agriculture, integration may have affected the sources of capital more than the amount of new capital used. Quite obviously this has resulted in shifts in the use of capital among areas, enterprises, lenders, and farmers.

Two questions regarding issues raised about imperfections in the capital market should be considered. First, do the lenders of capital to integrators consider their funds as going into agriculture — into farming? Or do they consider their capital as going into agri-business with the

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business entity of the integrator, who retains title to the products and assumes most of the risks, as the most important consideration in loan security? Do the lenders to integrators consider the main function of such capital to be helping farmers produce food more efficiently and profitably? If not, then the charge of imperfections in the capital market appears less valid. Moreover, if it is held that integration has attracted additional capital into agriculture by offering high returns, then overproduction and low prices resulting from excess use of capital introduces still other imperfections, and often a withdrawal of integration funds.

Second, has not capital come into agriculture because of integration — rather than integration coming into agriculture because of lack of capital or imperfections in the capital market? Supporting this reasoning is the fact that an adequate supply of capital has been available for the agricultural industry but it has not been available to many individual farmers because of excessive risks. Once these individual producers were tied-in by contracts with integrated feed or poultry processing firms, however, capital then became available. More security, less uncertainty, the spreading of risks, economies of scale, better management, and other changed conditions caused capital to flow to new entrepreneurial systems.

If integration uses capital more efficiently, then it will employ less total capital for a given amount of production. How much more efficiently does an integrated firm use its capital than a number of individual producers? A study under way by Farmer Cooperative Service indicates that the capital used in broiler contracting by a few regional cooperatives had a turnover of 8 to 11 times in 1959, based on their monthly outstanding balances. How would individual farmers producing four to five batches a year compare? Would they turn their average capital requirements only four to five times annually? Although their investment in land and buildings would remain the same for each batch, the turnover should be a little faster than this (four or five times annually) because they would not be able to obtain the maximum amount of capital for feed to finish each batch until the last three or four weeks of the production period.

As a sidelight, the experience of one regional farm supply and marketing cooperative horizontally integrated with 70 branches (but not engaged in contracting) indicates that this system makes more effective use of operating capital than would be the case if these branches were all independent cooperatives. Although each branch deposits funds daily at its local bank, they also send checks to the regional association's bank to avoid keeping an excess of idle money. This general bank serves as a revolving operating fund for the branches, and as many as 60 branches draw drafts on the general bank account for \$750,000 or more on some days. The regional association also arranges for all loans needed in the system.

The question of who provides the basic capital for vertical integration or contract farming has a number of implications for farmers. Will the integrator or the financier of the integrator in effect control

this segment of farming? Will either try to prevent overproduction or surpluses?

Farmers will need to strengthen their bargaining power to insure a fair return on their capital. As mentioned, in some cases this may be accomplished by use of auctions, bargaining associations, and government market orders and programs. Furthermore, farmers also must do more of their own integrating by developing large, strong cooperatives that will provide complete services. These would include production financing and management assistance, and processing and selling services in moving the product to the retailer or consumer.

If this is an important part of the answer, the implications for farmer cooperatives are tremendous. Farmers have over \$2 billion invested in purchasing and marketing cooperatives, but much larger amounts will be needed to finance both integrated production and marketing. For example, in poultry or hog enterprises, integration means feed milling, wholesaling, retailing, transporting, and financing; providing other production supplies and services; and assembling, processing, storing, transporting, and selling the product. It should be possible to develop arrangements with many local lending agencies to finance producers, and some progress has been made. However, to date, much of these funds for contract production have come through regional cooperatives and other sources. Some regional associations have set up credit associations, and others are considering them.

Vertical integration of the farm supply operations of cooperatives generally has been quite beneficial to farmers. While benefits are usually measured in terms of net savings per ton or dollar of business, they can be translated to returns on the farmers' investments in the cooperative. Such net savings of the principal regional wholesale and manufacturing cooperatives have been equal to 12 to 15 percent on invested capital or net worth in recent years. One large integrated association serving southern farmers with purchasing, marketing, and contracting services has had a return of about 12 percent. Two large poultry marketing and feed supply cooperatives in the Far West have had returns of 18 to 20 percent. Both of these cooperatives have well-developed programs that are both horizontally and vertically integrated.

In view of the growth and impact of integration on farming, farmers should carefully consider integrated cooperatives in investing available funds — both from the standpoint of efficient production and the effective marketing of their products.

There is a definite need for more research on both contractual integration and ownership integration in agriculture. Among the types of specific information needed that pertain to capital and credit are: (1) amount of capital used in contract farming — by sources, by types of enterprises, and by areas; (2) costs of capital used in integrated programs to the integrator and ultimately to the farmer; (3) efficiency with which capital is used in an integrated enterprise compared with a nonintegrated one; (4) reduction of risks to farmers, integrators, and creditors under various methods of integration; and (5) the significance of any imperfections in the capital market for agriculture in the development of integration.

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## *Farm Family Capital Accumulation and Investment Processes<sup>1</sup>*

THE ECONOMISTS OF EACH ERA have found themselves drawn or compelled by the events of their times to focus their economic knowledge on current problem situations. Tariffs in the 1920's, unemployment in the '30's, and problems of war in the '40's gave the economic literature of those decades a distinctive flavor. It is not so easy to typify the fifties. That may turn out to be the decade in which we rediscovered the problems of economic growth that occupied much of economic thinking from Adam Smith to the First World War. One of the most prominent manifestations of this interest is found in the extensive literature on problems of capital formation and investment.

The calculation of growth rates, capital-output ratios, and global estimates of net capital formation by sectors and countries are characteristics of our time. This chapter is concerned with problems of capital formation and investment, but on a reduced scale. The focus will be on regional and sectoral differences within the American agricultural economy, with particular reference to farm firms and households.

This choice of subject matter is dictated in part by a dissatisfaction with some of the agricultural policy recommendations for underdeveloped regions or countries that are being derived from analyses of mass data. In greater part, it is a reflection of the basic fragmented nature of capital formation in the agricultural sector, in which global outcomes are the aggregation of decisions by what is still the largest number of firms in any single segment of the American economy.

### CAPITAL FORMATION PROCESSES LEADING TO AGRICULTURAL GROWTH

At the outset it is important that knowledge of the capital-forming processes which lead to agricultural growth is properly understood. This process is predominantly one of accretionary gains in capital stocks in the early stages of a nation's development. The investment decisions involved are typically made in small segments, spread over

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<sup>1</sup> The author has benefited from the helpful suggestions of Reynold Dahl, Darrell Fienup, and Harald Jensen.



many seasons or gestation periods. The aggregation of capital formed in this manner leads to impressive totals, but these totals are the result of a process which is characterized by many small, even plodding, steps. The emphasis on large-scale and dramatic investment programs in the current literature on economic development may obscure this relationship. The image of development projected by a hydroelectric dam or by a steel mill is likely to be misleading if applied to agriculture. Capital in farming is rarely concentrated, in a spatial sense, and its formation is heavily weighted by the time dimension. It accumulates by an incremental process.

The results can be seen most readily in the case of livestock. Increases in livestock numbers and quality, the slow improvements in feeding levels, better animal disease protection, and increases in rates of gain are all achievements in which time plays an important role. Progress takes the form of small steps spread over many production cycles. This gradual accretionary improvement in livestock herds was one of the primary capital forming processes in the early stages of U. S. agricultural development. It is still under way in areas undergoing major shifts away from reliance on cash crops to livestock agriculture. It has been particularly prominent in recent decades in some states in the East South Central and South Atlantic regions of the United States.

Although easily identified in the livestock sector, this accretionary process is also important in the stock of farm capital represented by buildings, fencing, water supplies, and related farm service structures and improvements. The stock of this form of agricultural capital is built up gradually over time and typically over several generations. The same situation applies to land-clearing, ditching, drainage, soil improvement, and conservation. The process of accretionary build-up is particularly prominent where tree or bush crops are an important part of the agricultural economy.

The significance of these types of agricultural capital is reflected in the common observation that the "costs of producing a farm" are in general far beyond the capital-forming capacity of any one farm family generation. It is also reflected in the often discouraging experiences with farm development and land settlement schemes. The attempt to provide farms as going concerns through tenant purchase programs in the South, the resettlement programs in the Lake States (notably the Beltrami Island project in northern Minnesota), and the Matanuska Valley settlement program in Alaska are all cases in point. In each of these instances it proved impossible to finance the establishment of successful farms through any schemes for repayment during the lifetime of a single farm operator family. These examples from recent history reinforce the evidence from our pioneering experiences in the nineteenth century: the saving and investment potential of several generations is required to form the base capital needed before farm firms can take advantage of the high levels of input and output made possible by modern technology.

This historical discussion should serve to remind us of the validity of two general propositions:

1. The accretionary forms of agricultural capital formation are important in early developmental phases, and in phases involving a shift from a cash-crop economy to a livestock-feed economy.
2. The time required for the effective operation of these accretionary processes is long in terms of human life spans, typically extending over several generations.

From this point of view it is instructive to examine briefly some of the current theories which have been developed to account for lags and spurts in economic growth processes. One of the most challenging of these is offered by W. W. Rostow in attempting to explain the processes through which some economies have broken away from a predominantly agricultural base into a "take-off" stage that has subsequently led to self-sustaining industrial and agricultural development.<sup>2</sup> The initial stirrings of economic growth have typically been followed by relatively long periods of seeming stagnation in the growth process before the take-off stage. New agricultural processes are adopted, the shift to a money economy becomes apparent in rural areas, small but significant capital inputs appear to take place, yet nothing appreciable happens.

Our brief look at the historical process of capital growth in American agriculture suggests that one reason for this delayed response may be the time required for accretionary formation of capital in agriculture. Where these capital stocks are biological in nature, the limits within which the capital-forming process may be accelerated are rather definitely fixed. Agricultural policy for maximum growth in this phase of development would seem to call for the creation of patterns of production, consumption, and investment that will maximize accretionary processes.

Some of the basic conditions for agricultural development will be presented below. We may assume, as a point of departure, that we are dealing with an agrarian economy of a predominantly subsistent nature that can be characterized as a "subsistence-equilibrium" structure. In order for growth to occur under these circumstances, the most obvious and necessary condition is that an economic surplus potential be available for capital-forming uses. Douglas North has put this same proposition in a more advanced form by including the need for an "export" sector in which the agricultural products can be exchanged for domestic manufactures from outside the region, or for capital goods obtained through foreign trade. North demonstrated in his study of southern agriculture in the nineteenth century that the existence of this export sector is insufficient by itself to guarantee growth.<sup>3</sup> A return flow of the proceeds from the export sector is also necessary, with the

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<sup>2</sup> W. W. Rostow, *The Process of Economic Growth*, New York, W. W. Norton and Company, Inc., 1952, pp. 12-21. The argument is substantially expanded in his *The Stages of Economic Growth*, Cambridge University Press, New York, 1960, pp. 21-26.

<sup>3</sup> Douglas C. North, "Agriculture in regional economic growth," *Jour. Farm Econ.*, Vol. 41, No. 5, Dec., 1959, pp. 943-57.

maximum possible fraction of this return flow accounted for by complementary raw materials or producer goods.

## LAND TENURE AS A METHOD FOR CAPITAL FORMATION

Based upon the above discussion, it is proposed that the land tenure system constitutes a major force in creating an environment for motivation that will maximize the accretionary formation of capital in agriculture, and insure that available surpluses above subsistence levels are reinvested in the productive plant. In exploring the significance of the above hypothesis, and in attempting to derive from it some implications for agricultural policy, it is important to examine the manner in which tenure security can contribute to capital formation. By giving an individual or a group the preclusive use of a productive asset, a situation is created in which the investor can realize a satisfactory return on his investment. This security of expectation is crucial for biological forms of capital, slow maturing enterprises, and undertakings in which the ultimate stock of productive assets is composed of numerous incremental additions made at successive intervals over many production cycles.

Anthony Scott has pointed out the importance of making rights of asset use specific to the user, whether owner or tenant, in any process requiring long-term investment. "Unless the individual can appropriate and distribute the benefits created by his efforts and his property, he has no incentive to achieve efficiency in their provision."<sup>4</sup>

A system of tenure that will make these rights of use and reward specific to the user is a necessary, although not a sufficient, condition for capital formation. The tenure under which assets are held must also be adequate, in terms of time and scale, to motivate the user to reinvest his surplus.

The statements and propositions to this point are encompassed in the traditional observation that the prospect of ownership has served to "turn sand into gold." The beneficial results of the prospect of ownership are well understood, but the specific manner in which motivation is conditioned and directed by this prospect is less commonly recognized.

It is now hypothesized that the tenure arrangements under which productive resources are held and used will affect farm firm and farm family patterns of expenditures, savings, and investment by their influence upon:<sup>5</sup> (1) the operator's time preference for money income; (2) the allocation of expenditures between the farm firm and the farm household, over time; (3) the allocation of expenditures within the farm household as between goods and services for direct consumption and

<sup>4</sup> Anthony Scott, *Natural Resources: The Economics of Conservation*, University of Toronto Press, 1955, p. 117.

<sup>5</sup> Proceedings of the Interregional Land Tenure Research Workshop, Work Group A, University of Missouri, July 16-27, 1956.



expenditures upon the family residence; and (4) the disposition made of the total available labor time of the farm family.

The implications of these hypotheses will become clearer if two of the principal characteristics of a peasant-type or family farm agriculture are examined. As it has developed in Europe and North America, this structure of agricultural firms combines a mixture of owner-operated units with units operated by farm tenants under widely varying conditions of tenure duration and security.

From the standpoint of capital formation, the first important characteristic of the small proprietary or family firm is that consumption in the household must take place in the face of an alternative — investment in the firm. Every act of consumption thus requires a decision not to invest in the productive enterprise. The structural or organizational characteristic of the firm does not permit a separation of these decisions. They are joined within the family and usually within a single individual.

A decision-making complex of this nature is not unique to owner-operated farm firms. It is also found in small enterprises in retail trade, and in former years it was commonplace in manufacturing and industrial operations. Although this characteristic is not unique to agriculture, it is still a particularly prominent feature of farm production units. It has prevailed long after the proprietary firm has disappeared in all but small segments of the retail and service trades among nonagricultural occupations.

Operation within this consumption-investment matrix is calculated in two different units of measurement, viz., (1) the allocation of money income and (2) the allocation of family labor time. In terms of money income, and where tenure security is at a maximum, the operator can afford to balance the alternatives of maximum return over time from slow maturing enterprises against possibly lower yielding but quick-turnover forms of investment. Within the framework of his time horizon, which is typically confined to one generational change, he can rationally afford to undertake investments, the yield of which may not reach a maximum in his lifetime. He can also afford to contemplate the alternatives of appreciation in the value of his capital assets as against the enjoyment of realized periodic income. In short, a maximum incentive situation is created in which the growth aspects of investment can be weighed heavily when balancing them against annual yield.

A second important characteristic of the proprietary firm concerns the disposition of family labor. The prospects of long and secure tenure may also provide maximum incentive for the investment of total available labor time in productive undertakings. As with money income, each decision to allocate family time to leisure, or to work activities outside the farm firm, must be taken in the face of the clear alternative possibility of using this labor in the firm. Much of agricultural capital formation can be explained in this fashion. Livestock care, repair and maintenance of structures, drainage and soil improving practices, and

a variety of similar tasks are often accomplished in agriculture at the expense of what might validly be regarded as leisure time.

The fact that these incentive conditions are created by a tenure system is no guarantee that they will be used. The scale of farm operations is often too small, enterprises are not properly balanced, or the cultural and motivational patterns that might lead to these forms of investment may be lacking.

The biological nature of agricultural production bears heavily on these patterns of investment of family labor. Much of the "cost" of agricultural production is a time cost. Crops must ripen, animals must mature, and a principal part of the labor cost of these processes is the cost of waiting.<sup>6</sup> Even well-organized farm firms with a good balance among the labor requirements of different enterprises have substantial time periods in which the labor force must be on hand but is for the moment technically underemployed. A key to the processes of agricultural capital formation lies in the analysis of the use made of this periodically available labor.

Many farmers have time periods when this form of labor input is available at an opportunity cost that approaches zero, or is measured only in the reservation price of leisure time. An incentive system that will maximize the investment of this labor in the firm is one of the basic requirements for agricultural growth. In terms of capital creation, that structure is best which creates the maximum likelihood that the farm family will elect to "exploit" its own labor. Basic to this argument is the expectation of a long-term rise in real incomes. When incomes are falling or are uncertain, existing levels of living tend to be maintained at the expense of unrewarded depreciation or ultimate exhaustion of land and capital. The capital-creating combination of secure tenure and expectations or rising real income has its antithesis in the form of unrealistically high consumption goals coupled with the prospect of falling real income.

Some informative observations supporting this view of the nature of labor and capital investments in agriculture have recently been made by Simon Kuznets.<sup>7</sup> Working with data for American agriculture from various studies, Kuznets points out the contradictory results obtained in attempting to allocate agricultural income between labor and capital (cf. Chapter 3). In general, two variants of a residual method have been used by most research workers to estimate returns to labor and land in agriculture. In one, the return on property is estimated directly, and labor income is the residual. In the other, labor returns are estimated directly, and property income is residual. The resulting estimates are untenable since "...a direct estimate of the return on the property component leaves a return on labor that is below the going

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<sup>6</sup> John M. Brewster, "The machine process in agriculture and industry," *Jour. Farm Econ.*, Feb., 1950, pp. 69-81.

<sup>7</sup> Simon Kuznets, "Quantitative aspects of the economic growth of nations, Part IV, distribution of national incomes by factor shares," *Economic Development and Cultural Change*, Vol. 7, No. 3, Part II, April, 1959.

wage of hired labor; and a direct estimate of the return on labor leaves a return on property distinctly below any comparable market return rate."<sup>8</sup>

Kuznets concludes that if the data can be trusted, the existence of dual markets for capital goods and labor must be recognized. In one market, capital flows and labor moves in response to highest returns. In the other market, in which agriculture is the dominant but not the only sector, the flows of capital and labor are "tied to the way of making a living by combination with some specific type of labor service."<sup>9</sup>

These inferences suggest strongly that labor and capital inputs in agriculture are triggered by motive forces that are partially independent of off-farm opportunity costs and prices. This inference is consistent with an argument that tenure incentives exercise a strong motive force in agricultural capital formation, leading to continued investments of both capital and labor in the face of off-farm rates of return that are demonstrably higher.

In the currently peculiar position of American agriculture, plagued by surpluses, this reasoning would suggest that tenure incentives to capital formation may have worked too well. If a longer term view is considered, it can also be argued that these nonprice motives have been one of the sources of the strength and vigor of American agriculture.

These optimum conditions for capital formation in agriculture have been presented in terms of the owner-operated farm firm. It does not follow that the only form of tenure that can create these conditions is ownership. Leasing arrangements can create security of expectations specific to the operator, and for a period of time long enough to encourage long-term investment (cf. Chapter 2). Leasing arrangements that approximate this situation can be found in northern Europe, the United Kingdom, Australia, and in several other agricultural areas. Leases providing this degree of security are comparatively rare, and they were not characteristic of the periods of greatest agricultural development in North America in the nineteenth century. They were most conspicuously absent in the South after 1860.

Recognizing that the representative lease in American agriculture from our beginning as a nation has been some form of a short-term share lease, it will be helpful to examine more closely the implication of this tenure form for capital-forming processes. Where the land and buildings are provided by the landlord, with tenant contributions limited to livestock and equipment, the tenant has an incentive to invest in livestock and equipment but not in land improvements or structures. Under the lease forms that have been economically significant in American agriculture, the tenant has found it legally difficult and, in practice, virtually impossible to obtain reimbursement for the unexhausted value of any permanent improvements remaining at the expiration of his

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<sup>8</sup> *Ibid.*, p. 26.

<sup>9</sup> Kuznets, *op. cit.*, p. 27.



lease. Under these conditions, he had little or no incentive to devote income or leisure time to the gradual improvement or maintenance of the real property assets. Because of the importance of capital investments in farm buildings for some forms of animal agriculture, this may also discourage the shifting from a cash-crop to a livestock-feed form of agriculture.

Although this is the generalized motivational setting within which tenant farm operators must make choices between consumption and investment alternatives, there are many exceptions. The most prominent of these exceptions is the tenant who is in fact an owner-in-prospect, renting from a parent, or who has some equally adequate assurance that he may aspire to the status of owner-operator. There is ample research evidence in the Midwest to indicate that this motivational setting does in fact exist on a number of rented farms. Where these ownership expectations are limited, and where this weak incentive situation is associated with a heavily skewed pattern of income distribution and a prominent "demonstration effect" of conspicuous forms of consumption by a social elite, there exists what might be characterized as a minimizing condition for capital creation, i.e., economic arrangements limit the incentive for investment and the cultural setting maximizes the incentive for consumption.

The argument to this point may be summarized as follows: The optimum conditions for capital formation in agriculture are established when tenure systems create the security of expectations that will permit a reduction in current withdrawals of income for consumption purposes in favor of investment in the expectation of greater long-term total gains. This reduction in current consumption and increase in investment is strongly dependent upon the disposition made of leisure time. The necessary conditions are that the scale and organization of the firm be adequate to provide opportunities for these investments, and that the cultural setting sanction a suppressed level of current consumption in the interest of a reinvestment of income and family labor.

#### REGIONAL DIFFERENCES IN TENURE AS RELATED TO CAPITAL FORMATION

The conditions stated above were met in the pioneer phases of the settlement of the Middle West and the Great Plains in a combination that was rare if not unique in history. Tenure expectations were secure and specific to individuals. The choice of scale of firm and balance of enterprise was subject to few restrictions. The supply of consumer goods and the pattern of income distribution did not permit the "demonstration effect" of superior consumption levels to interfere seriously with investment.

South of the Ohio and east of the Mississippi these conditions were present to a significantly smaller degree. In some cases they were

almost totally absent. Tenure conditions were frequently insecure on the better soils, the scale of individual operations was typically small, and monoculture was common. The disparity in incomes was great and, from the beginning of settlement, agriculture developed in the presence of comparatively high levels of consumption enjoyed by a small but socially dominant group. Among the members of this social elite, levels of consumption were high both in terms of income and in the disposition made of leisure time.

Regional differences in tenure systems, in short, created a situation in which the South operated at a disadvantage in the accretionary formation of agricultural capital. These differences were greatest and the consequences most severe during the period from 1860 to the depression of the 1930's. This was the period in which the capital base was laid for the phenomenal increase in agricultural production during the 1940-59 period.

The westward settlement across North America was accompanied by a massive creation of operating capital out of land. Forests were wastefully exploited and soil fertility was mined to create an artificially high level of consumption and capital formation. The North American pioneer, in effect, practiced a form of "shifting cultivation" on a continental scale, from the first days of settlement until well into the twentieth century. He cut over, plowed up, depleted the land, and moved on. The regional disparity in this regard is also striking. The southern farmer played a prominent role in this exploitative phase of American agriculture, but differently. He, too, created capital and a synthetic level of living by exploiting labor and disinvesting the land, but after 1860 he rarely moved on.

One consequence of this voluntary immobility was the emergence of a class of owner-operators in the South whose tenure in land was as complete and as secure as in any region of the nation. Yet this security did not contribute to capital formation. These owner-operators were often on the hilly flanks of good soil regions, or on the exhausted soils left by prior cultural practices centered around continuous cash-cropping, little or no livestock and fertilization. The inadequacy of incentive conditions for investment when there is little or no surplus to be invested was demonstrated in this region.

The discussion thus far has been confined to the tangible forms of farm capital formation. In both farm and nonfarm sectors of any economy an exceedingly important part of the total stock of capital is to be found in the education, training, and skills of the labor force (cf. Chapters 3, 4, 5, 22, and 23). Although this stock of human capital is difficult to measure, its presence or absence can be readily detected. In the developmental stages of American agriculture, this form of capital investment was most commonly made in rural public schools through the medium of the property tax. Here again the land tenure system played an important role. Where the individuals who benefited were the children of the persons taxed, the identification of benefits with costs was immediate and within the range of comprehension of virtually

every taxpayer. This resulted in the early appearance of comparatively heavy rates of rural property taxation that were largely self-imposed.

Where the benefits of capital investment in education were not specific to the individuals expected to bear the costs, and this was the typical situation in the South, the incentives for this form of capital investment in human beings were weak. As a result, in some areas this led to a passive or even negative attitude toward the value of public education. The basic reasons for this situation were essentially the same as those connected with investments in land, improvements, and structures, i.e., it was by no means clear to the property owners who were required to pay the cost of educational facilities that they would be among the principal beneficiaries.

In addition to wide regional differentials in the degree to which capital has been invested in human beings, there have also been sharp differences in the degree to which internal migration has resulted in capital "imports" or "exports." As settlement expanded westward, there was a continual inflow of capital in the form of adult human beings. For well over a century, this westward flow of people served to populate the frontier with a labor force whose rearing and training had required no local investment of capital. This capital inflow in the form of labor represented one of the most significant forms of early capital investment in American agriculture.

A similar though smaller inflow of capital had taken place in the states of the Atlantic seaboard in earlier decades, augmented throughout the eighteenth century by the slave trade. Until the middle of the nineteenth century, the differentials between the North and South in these forms of human capital inflow were not great. They became great after the discovery of gold in California, the opening of the Oregon territory, and the construction of the transcontinental railways. Until the outbreak of World War I, the agriculture of the Middle West and the Great Plains was the direct beneficiary of a massive inflow of capital in human form, a composite of migration from home and abroad. This contribution to capital formation had largely run its course in southern agriculture by 1860.

This capital flow through migration has been reversed. American agriculture is playing the unfamiliar role that had so long been played by the more urban and industrial regions of the eastern United States and Europe. Here, too, there are significant regional differentials. The outmigration of adult labor began earlier in southern agriculture and had reached proportions in the 1930's that were not experienced in the Middle West until the 1950's. In an evaluation of regional differentials in the capital position of American agriculture, the importance of these human capital flows has been underestimated.

The discussion to this point has been devoted to ways in which the land tenure structure can create optimum incentives for capital formation in agriculture. It would be helpful if these hypotheses could be tested by resorting to recorded data on state and regional capital



stocks in agriculture and their rates of change. However, these data (i.e., state and regional breakdowns of the type now presented annually in the Balance Sheet of Agriculture) are not available. In the absence of such data, some insight into current patterns of capital formation can be gained by a brief examination of regional differences in farm firm and household expenditures. Estimates of expenditures for major items of farm production capital and major household expenditures for the United States and for the South east of the Mississippi are presented in Table 9.1. *Farm, farm operator families*

With 34 percent of the farms and 34 percent of the farm operator families in 1955, southern agriculture accounted for only 11 percent of the total production expenditures on livestock and poultry, 19 percent on farm improvements, and 19 percent on motor vehicles, machinery, and equipment. In contrast, expenditures on food and clothing were 29 and 31 percent, respectively, of the nation's farm total. This was only slightly below the proportion that would be expected if the expenditures in southern agriculture per farm firm and household were

Table 9.1. Comparison of Selected Farm Production  
and Family Living Expenditures,  
United States and South, 1955

Item	Total United States	South Atlantic plus East South Central	South as percent of U. S.
Number of farms	4,675,700	1,576,400	33.7
Number of farm operator families	4,760,050	1,615,782	33.9
<u>Class of Expenditure</u>			
<u>Farm Production</u>		(thousand dollars)	
Livestock and poultry	2,593,781	294,362	11.3
Repairs, maintenance and construction of farm service buildings and other farm improvements	1,727,739	331,478	19.2
Motor vehicles, farm machinery, and equipment	2,763,264	510,124	18.5
Total Production Expenditures	24,699,661	4,363,666	17.7
<u>Family Living</u>			
Food	3,963,519	1,160,738	29.3
Housing	4,133,006	1,036,278	25.1
Clothing	2,034,681	639,290	31.4
Transportation	1,798,149	504,770	28.1
Total Family Living Expenditures	15,722,505	4,363,162	27.7

Source: Farmers' Expenditures in 1955 by Regions, USDA Stat. Bul. No. 224, Washington, D. C., April, 1958, Tables 13 and 17.

in line with national averages.<sup>10</sup> Expenditures on housing in the South were appreciably lower, accounting for only 25 percent of the national total. Some adjustment would be needed in this figure to make it comparable with national estimates, due to climatic differences.) While admitting the need for this adjustment, it would seem that housing expenditures in southern agriculture are well below the relative level of family expenditures on other consumption items.

(Southern agriculture in 1955 accounted for 18 percent of total U. S. farm production expenditures and 28 percent of farm family living outlays.) Recognizing the crude nature of these comparisons, the over-all implication is clear, viz., in comparison with national totals, the relative proportion of the income flow from southern agriculture devoted to consumption expenditures is significantly greater than the proportion allocated to farm production. These data suggest that current rates of investment in accretionary forms of capital in southern agriculture in 1955 were substantially below the average levels prevailing in the nation.

Many aspects of this particular discussion need more thorough analysis (cf. Chapter 27). The land tenure institutions of a region do not exist in a vacuum, and many other forces have shaped the progress of agricultural development in the South and throughout the nation. Moreover, the patterns of land tenure in some regions are changing rapidly. (Between 1935 and 1955 the percentage of southern farms operated by full-time tenants was cut in half, dropping from approximately 60 percent of all farms to 30 percent.) The acreage of land in farms operated by full-time tenants in the South in 1954 was not significantly different from the national average of 16.4 percent of all land in farms. (However, this figure is misleading since 48 percent of the cotton acreage and 50 percent of the tobacco acreage harvested were in the hands of full-time tenants in 1954.

In view of these rapid changes over the quarter-century of 1935-60, it would be instructive to examine differential rates of current capital investment on owner-operated and tenant farms in southern agriculture and in the Middle West. It is hoped that the hypotheses advanced here, and the arguments supporting them, can serve as a stimulus and guide for investigations of this type.

<sup>10</sup> The absolute dollar levels of expenditures on clothing provide a particularly sharp contrast with regional differentials in production expenditures. Average expenditures per farm on clothing for selected regions in 1955 were as follows:

South Atlantic (Florida, Georgia, North Carolina, South Carolina, Virginia, West Virginia)	\$383
East South Central (Alabama, Kentucky, Mississippi, Tennessee)	\$388
West North Central (Iowa, Kansas, Minnesota, North Dakota, South Dakota)	\$375

See Supplement to Farmers Expenditures in 1955, USDA, AMS-354, Washington, D. C., Dec., 1959, Table 7, p. 42.

## IMPACT OF URBANIZATION

We have witnessed a massive "urbanization" of the entire nation. Rural standards of living have advanced near the urban level, and the levels of achievement within these standards have moved very close to urban levels. The full weight of "Madison Avenue" has been felt in rural as well as in urban areas. Many developments have contributed to this trend. The closing of rural churches and incorporation of rural congregations into urban church bodies has been one prominent force working in this direction. A similar force has been the consolidation of rural schools. The Selective Service System has exercised a powerful influence in "uprooting" young men from isolated communities in backward rural areas. The impact of the "demonstration effect" of urban consumption on rural people has been dramatically increased by the virtually universal extension of good roads and of electric power to farms through the REA. By 1959 three-fourths of all farm families had television and a larger percentage of farm families owned two cars than did their urban neighbors in many farm states.

One of the most remarkable manifestations of this trend has been the rapid change in the quality of rural housing. Although severely handicapped by the absence of credit and financing arrangements now generally available in urban areas through mortgage insurance, re-discount, and loan guarantee programs of the federal government, farm housing has been markedly improved since 1945. We may be witnessing, for the first time in our history, the emergence of the farm home as a consumption good, breaking sharply with its previous role as an adjunct to the farm firm.

This upgrading in rural family consumption patterns occurs in an economic setting in which the key decisions for industrial nonfarm capital formation have been institutionalized. We can afford an appeal to the consumption aspirations of a mass industrial population with little danger that consumption expenditures at the family level will seriously restrict the nation's capacity for investment and new capital formation. This is not true in agriculture. The capital-forming process in agriculture is still predominantly personalized, (cf. Chapter 21). The rural decision to consume is a decision not to invest. Agriculture in this setting finds itself at a disadvantage. Unable to provide expansion capital through the control of supply and prices, and the plow-back of earnings, the farm family is left with the traditional alternative of capital creation through the exploitation of family labor and levels of living. The potential inherent in this source of capital formation is impaired as rural levels of living and time allocation approach urban standards. We are left with the prospect that some method of institutionalizing the capital-creating decisions seems indicated for agriculture if current rates of agricultural advancement and improvement in rural levels of living are to be maintained.



In view of the rapid industrialization under way in the South, it is possible that the urbanization of the countryside may in broad terms lead to an uninterrupted line of development in southern agriculture. It has been suggested in this chapter that agriculture in the South has been household-oriented and consumption-expenditure-conscious throughout the nineteenth century to the present. This region did not participate fully in the era of low consumption and heavy farm firm investment that was spurred by the prospect of free land and farm ownership. In the sweep of historical development in American agriculture, it may well be that the phase of heavy investment in the farm firm, spurred by ownership expectations, has bypassed the South. Improvements in the tenure structure that tend to improve incentives for farm firm investment are coinciding with increasing farm family expenditures on a scale that may still leave the capital-forming position of southern agriculture at a disadvantage.

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## *Adjustments and Capital Use in Agricultural Regions*

GREATER ATTENTION is being focused on the changes taking place in the agricultural sector of the economy. Adjustment problems inherited from the past along with the expected problems of the future make adjustment problems in agriculture more conspicuous. Population increases, changing tastes and values, technological developments, and institutional changes are among the factors giving rise to perennial adjustments which must be expected and accepted. The efficiency of agricultural production varies considerably among different regions and among different segments of the agricultural economy. Heady discussed efficiency in the utilization of agricultural resources by the farm firm in Chapter 6.

Maximum economic efficiency becomes intricate and complex and probably never will be attained. However, the considerable mobility of resources, such as labor and capital, provides evidence that the theoretical system is descriptive of desirable end points which cause resource shifts. The problem of unattainable ends derives, in part, from the fact that allocation for maximum net returns involves an anticipation by entrepreneurs of each others' actions as influenced by the time required for production. Therefore, errors in expectations are responsible for a large part of the misdirection of resource use. Experience with these entrepreneurial expectations leads to internal and external capital rationing which tends to cause emphasis to be placed upon resources that are more flexible — namely labor.

In a competitive equilibrium, a specific quantity of any resource should make approximately the same marginal contribution regardless of where it is employed. It is common knowledge that considerable differences in productivity of resources in agriculture exist within and among the geographic regions, and probably the most important reasons are the differences in the quantities of other factors available for combination with labor. This is not unlikely since about 60 to 75 percent of net farm income is attributed to labor when capital is valued at the current rate of interest.

The increasing need for maximizing net returns will prompt farmers, owners, and users of farm resources to allocate their resources in the "best" possible way under the existing and anticipated circumstances. While the quantity and quality of resources available clearly affect the

net return, the influence of social institutions in influencing resource adjustments must also be appreciated. However, the economic impact of resource adjustments on an area's economy is not fully understood because of the lack of knowledge of the technical rates of transformation and the rates of substitution of resources within regional and national aggregates.

For the individual farmer, the relative level of income, and therefore his standard of living, is determined by his ability to secure an efficient use of his resources. Regional differences in income per farm or per unit of resource results from varying degrees of inefficiency in resource use. Thus, low-income problem areas result mainly from pressure on the land to provide subsistence, and tend to predispose high degrees of conservatism in decision-making (Chapters 14, 21, 22, and 23). The unemployed or underemployed resources constitute one of the most basic of the long-range problems facing agriculture. Price supports and allied programs contribute little or nothing to the long-range resource adjustments and may even retard desirable trends of this kind.

## TYPES OF AGRICULTURAL ADJUSTMENTS

Differentials in productivity of resources are largely a function of the quantities and combinations used. It is recognized that resources are not homogeneous in all areas since, for example, a 640-acre farm unit in east Tennessee does not have the same quality of land as one in Iowa or the Mississippi Delta. Climate, level of technical knowledge, and value systems operating in the region clearly affect the productivity of resources in any particular region (Martin's discussion in Chapter 4). There is no doubt that equilibrating forces are operating, but there is considerable doubt that the efficiency in the sense of the equalizing of marginal returns for comparable resources in all regions will ever be achieved.

### Adjustments in Resource Organization

Under conditions of changing demand and technology, the farm income of an area depends largely upon the ability of farmers to adjust their resources to changing conditions. Often these conditions are closely related to nonfarm developments through the impact of the factor and product markets. Some regions have more efficient factor and product markets and fewer impediments to adjustments in factor organization.

Land use adjustments. The total acreage of cropland used in production expanded steadily along with the population until 1920, and has changed little since then, while population has continued to increase. This has resulted in a steadily decreasing per capita acreage from 3.8 acres in 1920 to about 2.0 acres in 1960. Increases in population,



expansion of industries, and scientific and technological advances in crop and livestock production have brought about shifts in the use of cropland. The resultant shifts reflect man's reaction to the environment since adjustments are made according to what has been perceived to be economic. Thus, regional specialization of farming activities tends to be conducive to development of economic group interests which become concerned and demonstrative when changes affecting their particular activities are taking place.

The all-time high output from farm crops in 1957 was from the lowest harvested acreage since 1917.<sup>1</sup> However, cropland harvested increased slightly immediately after World War II and remained almost constant until 1954 when it began to decline. Since 1940 some rather drastic changes have occurred in cropland used in the different agricultural regions. The New England states have experienced the greatest decline of any region, dropping to a low of 58 percent of the 1940 acreage, or 50 percent of the 1944 World War II level. On the other hand, the Mountain states increased their cropland rapidly until the 1952 level was 140 percent of the 1940 acreage, but this growth has leveled off to slightly below the 1952 level. Since 1948 the Pacific states have maintained the cropland acreage at about 112 percent of the 1940 level. The North Central states, which have a tremendous influence on farm output, have maintained cropland at 105 to 110 percent of the 1940 level with a slight decline since 1954.

In addition to the New England states, the Middle Atlantic, South Atlantic, and South Central states have experienced a rather steady decline in cropland used, though somewhat less dramatically than the New England area. These three regions have experienced fairly close rates of decrease, reaching a low of 75 to 80 percent of the 1940 level for all the three areas.

Adjustments in the number of farms, and consequently their size as measured by acres, are an important consideration in agriculture. Since 1929, about 1.5 million farms, or one-fourth of the number in the United States, have disappeared. About two-thirds of this decrease occurred during the 1945-54 period, with about one-third of the decrease occurring during 1949-54. Most of this reduction occurred in commercial agriculture, since part-time, residential, and subsistence farms increased approximately 200,000 from 1929 to 1954. Thus, the 1.5 million farms (about 65,000 per year) have been absorbed into active farms. The average size of all farms increased from 157 acres in 1929 to 242 in 1954, an increase of over 50 percent, with most of this taking place since 1940. The average size of commercial farms increased over 50 percent from 220 acres in 1940 to 336 by 1954.

Land substitution. Resources possess varying degrees of substitutability in production. Capital, labor, technology, and management may be considered as substitutes for land in producing a given output.

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<sup>1</sup> Changes in Farm Production and Efficiency, USDA Stat. Bul. 233, Washington, D. C., Revised July, 1960, pp. 20-21.

Fertilizers are of great importance and can become a very important substitute for land, should farmers elect to hold output and other variables constant. No doubt fertilizer has played an important part in maintaining a high level of crop output in spite of the decline in cropland in the New England and the southeastern states. Assuming a fixed acreage, farmers obtain the highest net return when they distribute their expenditures so that the marginal value productivity of each unit of input is the same and is also equal to the prices of the units of input. Farmers have clearly found that the marginal value productivity of fertilizers is very high while its costs are relatively low. As a result, the use of fertilizers in the United States has expanded rapidly, increasing from 1.7 million tons of plant nutrients in 1940 to 6.2 million tons in 1957, or 368 percent of the 1940 level.<sup>2</sup> However, most estimates indicate that rates of application are still far below the level that would be most profitable in many areas, i.e., under usual cost-productivity conditions.

The greatest increase in the use of fertilizers has occurred in the North Central states, increasing from 252 thousand tons of nutrients in 1940 to 2,331 thousand tons in 1957, or 925 percent of the 1940 level, with the western portion of this area making the fastest gain. In the Corn Belt, estimates are that the rate of application could be economically increased by two to three times the amount applied in 1954 under reasonable corn-fertilizer price relationships. With large farm units, high levels of capital investment in equipment, and the good levels of management existing in these states, fertilizer use could reasonably be expected to be highly productive, particularly in irrigated areas.

A rapid increase in fertilizer use occurred also in the Mountain and Pacific states, reaching a high of 702 percent of the 1940 level in 1957. In 1940 only 85 thousand tons of plant nutrients were used. Fertilizer and water substitute for each other at a diminishing rate in farm production, and since water is the limiting factor, it has been economically feasible to use larger quantities of fertilizer not only to maintain but to increase the output.

The New England states experienced the least increase in the use of fertilizer of any geographic area, reaching a high of 158 percent of the 1940 level in 1949 but declining to 142 percent in 1957. The Middle Atlantic and South Atlantic states also made a relatively slow gain over the 1940 level of 888 thousand tons of plant nutrients, reaching a high of 215 percent of that level in 1955. However, these states have for many years made heavy use of plant nutrients. In the East South Central states, fertilizer use increased by 1957 to 277 percent over the 1940 level, while in the West South Central states it rose to 612 percent.

These regions with a smaller rate of increase of fertilizer use over the 1940 level apparently had a much more narrow gap between the marginal value product of fertilizer with respect to corn and the price

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<sup>2</sup>W. Scholl *et al.*, Consumption of Commercial Fertilizers and Primary Nutrients in the U. S., ARS, USDA, Washington, D. C., fiscal years 1946-58; Changes in Farm Production and Efficiency, *op. cit.*



of fertilizer than had the Corn Belt. However, the gap in the Corn Belt area appears to be narrowing. Also, the relative changes that have taken place may also indicate that the marginal value productivity of fertilizer with respect to the crops of the Southeast may be closer to the price of fertilizer than that of the crops in the Corn Belt.

Pesticides, which include insecticides, fungicides, and herbicides have contributed greatly to increased production by preventing crop destruction. While they are not considered growth-producing resources, they must occupy an important role in making other resources more productive. Thus, pesticides may become very productive and a fairly important substitute for land in achieving a given level of output.

Farm labor adjustments. In the major part of the agricultural economy, labor is the chief single input. Priced at market wage rates, labor has a greater value than the annual services of land or other capital items. Labor has made up a decreasing percentage of total farm inputs since 1940, accounting for about 45 percent of total inputs in 1947-49 and dropping to about 30 percent in 1958. Labor in agriculture is more dispersed than in any other industry and is mostly furnished by farm operators and their families. One of its most valuable properties is flexibility of use. Many farm families can have a desirable level of income only if the productivity of labor can be increased.

Productivity of labor depends upon the level of other resources. In general, areas of low labor productivity are those of high capital productivity since labor is used in large quantities relative to capital. An increase in the amount of capital used with existing labor in areas of low productivity would increase the returns to the labor and lower the returns to capital. A reduction of the labor force because of the decrease in the labor-capital ratio would have the same effect. Both types of adjustments have been taking place.

Farm labor efficiency has been increasing since the country was settled, but the greatest gains have been made since 1910. Man-hours per crop acre have decreased steadily since 1942, reaching a low of 56 percent of the 1940 level in 1957.<sup>3</sup> During the 1950's the decline averaged close to 4 percent per year. All geographic divisions except the western states (Mountain and Pacific regions) have paralleled closely the changes for the United States. The quantity of labor used in the western region declined, but at a slower rate, reaching a low of about 80 percent of the 1940 level by 1950.

While the labor input declined, the total farm output increased steadily, reaching 136 percent of the 1940 level in 1957.<sup>4</sup> In the 1950's productivity rose over 2 percent annually as compared with 0.5 percent in the 1920's. Increases in crop yields have been the major source of the big increase in farm output, with yield increases ranging from 20 to 75 percent in the 1950's. The yield of corn, which accounts for a fourth of total crop production, increased by about 35 percent. Little improvement

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<sup>3</sup> Changes in Farm Production and Efficiency, *op. cit.*, pp. 36-39.

<sup>4</sup> *Ibid.*



in feeding efficiency, except in broiler production, has occurred since 1947. Output of broilers per unit of feed has increased by about 40 percent. The farm output of the eastern states (New England and Middle Atlantic) and the southeastern states (South Atlantic and South Central) has not kept pace with that of the nation, while the North Central states and the western states have exceeded the national average, with the western states reaching 166 percent of the 1940 level by 1958.

The output per man-hour increased steadily to 204 percent of the 1940 level by 1957 due primarily to the declining quantity of man-hours used and to an increased quantity of other resources or resource adjustments caused mainly by improved technology.<sup>5</sup> The output per man-hour in all geographic areas paralleled very closely the national average, except for the North Central states which increased at a faster rate, particularly after 1947.

**Labor substitution.** Labor productivity and farm incomes are highly dependent upon the amount of capital available. This means that capital will not substitute for labor at a constant rate. In many areas, an average farm family with a small quantity of capital cannot obtain a return from their farm comparable to that which could be earned if their resources were paid the market value in other uses.

Capital investment per farm worker averaged \$20,651 in 1959, or 605 percent of the 1940 level.<sup>6</sup> This increase was due partly to a small increase in quantity, but mostly to rising prices of farm assets — particularly real estate — and a decrease in numbers of farm workers (Chapters 6 and 7). Of this investment, machinery increased at a faster rate, reaching 948 percent of the 1940 level in 1959. The number of tractors on farms in 1959 increased to 303 percent of the 1940 number.<sup>7</sup> Together with tractors, increased investments were made in complementary equipment and farm trucks. Also, farmers have been purchasing nonfarm inputs which, when combined with labor, made their labor more productive. As a result, the number of people supported by a farm worker in 1959 increased to 220 percent of the 1940 level, indicating a considerable increase in farm worker efficiency.<sup>8</sup>

**Capital adjustments.** Capital investments are not inputs in the sense that they are immediately used up in production. They give services which vary in degree of exhaustibility (Chapters 2 through 5). To attain optimum levels of productivity in farming, it is important that the quantity of capital be adequate both in relation to the labor supply and other inputs and that the kinds of capital be in correct proportion for the level and type of production.

Real estate comprised more than 70 percent of the total value of physical farm assets in the United States in the 1950's (Table 6.1). In 1940 real estate comprised 75.5 percent of the total value of these assets; machinery, 7 percent; crops, 6 percent; and livestock, 11.5 percent.

<sup>5</sup> *Ibid.*

<sup>6</sup> Agricultural Outlook Charts, AMS, USDA, Washington, D. C., 1960, Table 34, p. 57.

<sup>7</sup> Changes in Farm Production and Efficiency, *op. cit.*, p. 33.

<sup>8</sup> *Ibid.*, p. 44.

By 1959 this asset mix shifted, with real estate decreasing slightly to 73 percent, machinery rising to 10.8 percent, crops decreasing to 5.5 percent, and livestock decreasing to 10.6 percent of the total value. The asset mix differs greatly between commercial and subsistence agriculture, especially when the various commercial types of farming are considered.

The real estate portion of the northeast dairy farms constituted about 50 percent of the total invested in the 1950's, whereas on Kentucky tobacco-livestock farms it made up about 80 percent of the investment.<sup>9</sup> In general, the proportion of total investment in real estate did not increase greatly during the 1950's, although the Corn Belt hog-beef fattening area and the New Jersey poultry area did show substantial increases. Most of the adjustments over the 1950's in the asset mix occurred in machinery, livestock, and crops. In almost all of the commercial farming areas, the proportion of the total capital investments allocated to machinery increased.<sup>10</sup> In the peanut-cotton area, machinery increased from 7.5 percent of the total investment in 1948 to 17.9 in 1958, with most of this increase occurring before 1954. The New Jersey poultry farms showed only a very slight increase in the machinery proportion during the same period of time. This increase of machinery came at the expense of livestock and crops. The capital investment in livestock and in crops on Piedmont cotton farms decreased from 8 and 5 percent of the total in 1948 to 4.2 and 2.3, respectively, by 1958.<sup>11</sup> Similar but less drastic changes occurred in other commercial farming areas.

The increase in proportion of machinery of the asset mix indicates that commercial farmers are increasing the productivity of their labor input by improving the labor-capital ratio. Also, the price of farm labor has encouraged a shift to more machinery.

Capital substitutes. Scientific and technological advances over the 1950's affected the productivity of land and labor (Chapters 4, 6, and 7). In one sense, science and technology constitute a form of capital when combined with management that is essential for modern commercial farming. The scientific and analytical mind which can view the varied phenomena confronting a farming operation and formulate decisions with a minimum of error is an excellent complement to the other resources involved (Chapters 20 and 21). A great deal of evidence points to a trend toward a higher level of formal education for highly commercialized farming and less reliance upon custom and tradition as a basis for decision-making. Woodworth and Fanning develop this point in Chapter 23.

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<sup>9</sup> Farm Costs and Returns, Commercial Family-Operated Farms by Type and Location, USDA, Info. Bul. 176, Aug., 1959.

<sup>10</sup> *Ibid.*

<sup>11</sup> Farm Costs and Returns, Commercial Family-Operated Farms by Type and Location, *op. cit.*

### Enterprise Adjustments

Specialization of production represents an adjustment to the prevailing physical and economic factors that influence land use. The degree of specialization depends on (1) the nature of the relationship of production possibilities, which in turn depends on the nature of the production function for each product, and (2) the price ratios of the products. Any forces which cause changes in price relationships or the nature of production possibilities can change the pattern of production. Enterprise adjustments can and do take place on the farm, within and among regions and among nations. A major shift in location of cotton production in the United States has taken place over the years since about 1930. The cotton acreage of the South has decreased from 43 million acres in 1929 to 17 million acres in 1955, while the three western cotton-growing states increased the cotton acreage from 645,000 to 1,498,000 in the same period.

The extension of speedy, refrigerated transportation equipment provided an opportunity for many areas to increase the output of vegetables. The substantial increase in the consumption of frozen vegetables since 1940 came at the expense of some other products, and the impact on the supply areas and market structure is obvious. Since 1940, the location of vegetable production has shifted significantly to the western states, particularly California. The western area has doubled its production, and the only other region to increase at a faster rate than the national average was the South Atlantic area. The South Central states maintained their proportion of the total output, while the North Atlantic and North Central regions increased production at a slower rate. The biggest increase in vegetable production occurred in three states producing for specialized outlets — Florida for fresh market, Wisconsin for canning, and California for both fresh and processing outlets.

Changes in per capita consumption of some farm commodities will force enterprise adjustments. For example, per capita consumption of cotton decreased from 30 pounds in 1940 to 22.2 pounds in 1958, and sweet potatoes from 16.2 to 6.6 pounds, while per capita consumption of processed frozen vegetables increased from 1.2 to 15.4 pounds during the same period. Many other adjustments which gave rise to major enterprise adjustments, not only within the farm unit but both within and among regions, have taken place in consumption since 1940.

### FINANCIAL AGRICULTURAL ADJUSTMENTS

Credit agencies were among the first to feel the impact of the adjustments occurring within agriculture. Lower farm incomes led to many of the adjustments to improve farming efficiency. As the degree of commercialization and specialization continue to increase, more capital will be needed to finance resource acquisition. Farm enlargements, machinery, and other nonfarm production goods, such as fertilizers,



insecticides, gasoline, etc., have contributed to the increased use of borrowed capital to supplement the farm-generated capital and the capital obtained through leases. However, the large number of small farms, many with limited managerial input, which are found extensively in the South, presents serious credit problems for regular credit agencies (Chapters 14 and 23). These conditions are conducive to the development of contract farming where management and capital are provided in combination with the farmer's labor and land, as was shown by Jones and Mighell in Chapter 8. It has been said frequently that most farmers, except those with very low incomes, can obtain all the credit they are willing to use for making adjustments. Internal rationing of credit is probably the major obstacle to financing such adjustments. Coutu and Lindsey discuss this problem in Chapter 21.

### Real Estate Mortgage Debt

Capital requirements to enlarge the size of farming operations by means of adding acres, and to finance purchases of real estate from those who leave farming, have increased since 1947.<sup>12</sup> Hathaway and Murray present detailed data on this subject in Chapters 5 and 11 (Tables 5.1 through 5.5). Over 40 percent of the purchases in 1958-59, as compared with 20 percent in 1950, were for the purpose of adding land to existing farms. The western two-thirds of the United States is most affected. In the western cotton area, 60 percent of the farm land purchases in 1959 were for farm enlargement as compared with 24 percent in 1949. From 1940 to 1947 the real estate debt declined to 69 percent of the 1940 level, apparently due to high incomes and limitations of consumption and production resources imposed by World War II. The farm mortgage debt in New England, West North Central, East South Central, and Mountain states decreased considerably more than the national average, with the East South Central region reaching a low of 46 percent of the 1940 level in 1946. The debt in the South Atlantic region reached a low of only 91 percent in 1946 and a high of 245 percent of the 1940 level in 1958. Two other regions — East South Central and Mountain — which had a relatively low real estate debt in 1946, increased loans at a faster rate than the nation as a whole, reaching 205 and 222 percent, respectively, of the 1940 level in 1958. The New England and West North Central regions, which has decreased the debt to 57 percent of the 1940 level, rose only to 109 and 116 percent of that level in 1958.

Prior to 1940, the federally sponsored agencies held large amounts of the farm mortgage loans, but since then, particularly 1942, the amount held by these agencies declined substantially. Mortgage holdings of the Federal Land Banks decreased to 37 percent of the 1940

<sup>12</sup> Agricultural Finance Review, ARS, USDA, Washington, D. C., Vols. 1-21, 1938-1959. See also Current Developments in the Farm Real Estate Market, ARS, USDA, Washington, D. C., Oct., 1959.

level in 1950, but had increased to 73 percent by 1958. Only the Mountain region had increased the real estate debt above the 1940 level by 1958. Changes in standards used in determining normal agricultural values and on-the-dollar limit will have some effect on the amounts loaned, but the 65 percent limit and conservative policies may make it difficult for the Land Banks to regain their prominence.

Life insurance companies have replaced the Federal Land Bank as the chief institutional lender. In 1940 Federal Land Banks held over 37 percent of the total real estate loans as compared with 13 percent for life insurance companies. By 1958 life insurance companies held 25 percent of the total as compared with 18 percent for the Federal Land Banks, and had increased the total amount held to 292 percent of the 1940 level. Recently they have been very active in the Northeast and in the western states.

Individuals have for many decades constituted the most important source of credit for real estate purchases. In 1940 this group held 49 percent of the total debt, and by 1958 their holdings had increased to 54 percent. This group has served a very useful function because they have provided credit when the traditional institutional patterns have failed to do so. The southeastern states have made more use of this group than other areas, reaching over 300 percent of the 1940 level in 1958 as compared with 167 percent for the nation.

The rapidly expanding industrial economy and greater urbanization of the population will place heavy demands on the anticipated savings for investment purposes. On the other hand, pressure can be eased considerably by the rapidly increasing use of the sales contract. This type of low equity financing was used widely during the 1950's in the North Central region. Also, commercial banks are becoming increasingly more active in this field, although their potential appears to be somewhat limited for long-term financing (Chapters 13, 15, and 16).

### Nonreal Estate Debt

Adjustments in size of operations are also financed by borrowing for the nonreal estate items of production, although a large portion of these items are farm financed. Much of the borrowed capital for such short-term purchases is secured by chattels on crops, livestock, and equipment, and is therefore influenced greatly by the character and ability of the borrower.

All agricultural regions increased in the use of nonreal estate credit to about the same degree. The credit provided by the Production Credit Associations has increased rapidly since 1955, but commercial banks still provided approximately 75 percent of this type of credit in the United States in 1959. However, the amount held by lending groups varies from state to state and from region to region, depending upon the institutional restrictions. Bank credit, for example, accounted for

87 percent of the nonreal estate debt in Arizona in 1959, but only 48 percent in Louisiana.<sup>13</sup>

Installment credit has been used fairly successfully for medium-term investments, and in some areas farm credit unions have made significant headway. Merchant credit of some form has been used in substantial quantities and promises to increase, particularly if contract farming and the present interest rates continue (Chapter 11). Often a credit subsidiary of a retail store will show greater profits than the parent firm. This development will push farm financing away from the local sources and place it in the hands of absentee financiers. One of the principal developments in nonreal estate loans is the increasing need for longer maturities for loans, commonly called intermediate-term loans, for capital improvements. Diesslin presents the case for such a development in Chapter 13.

### Productivity of Capital in Agriculture

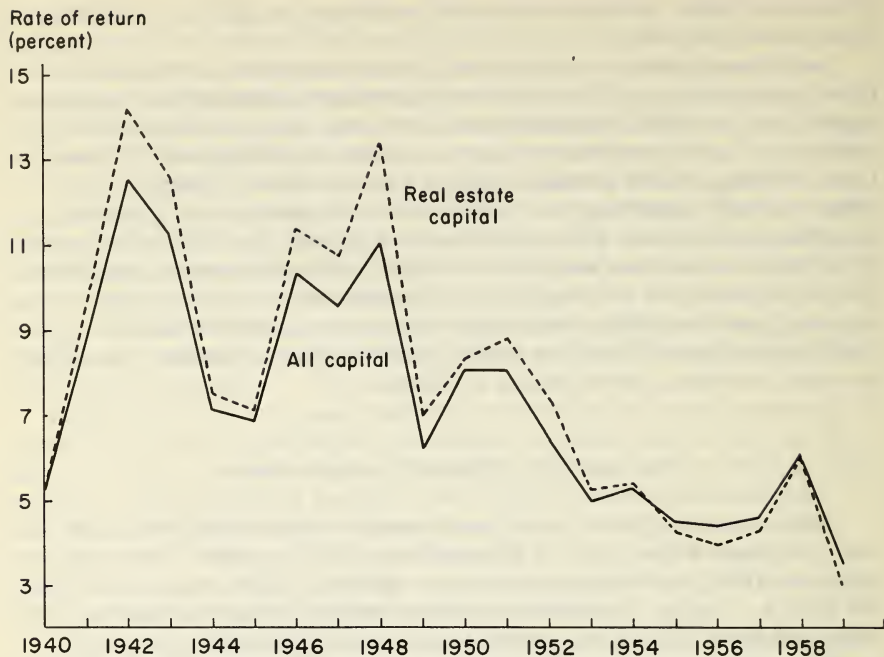
The productivity of a resource in various uses in relation to its cost determines how much of that resource will be used. The productivity of capital invested in agriculture declined rather sharply during the 1950's. Capital investment per farm worker increased rapidly, while net farm income fell, resulting in a rapid decline in the net income per dollar invested. The net farm return per dollar invested for the nation in 1951 was 19 cents, but declined to a low of 10.7 cents in 1957.<sup>14</sup> In the southeastern states where capital investments have been traditionally low, the net income per dollar invested has been the highest of any area in the nation. The western states have had the lowest net income per dollar invested.

During the 1940's and '50's about 75 percent of the farm assets were in the form of real estate and 25 percent in nonreal estate. The proportion of capital borrowed ranged from about one-fourth in 1940-41 to a low of about one-tenth in 1946-49, but was fairly constant at 14 percent after 1954. A large portion of the capital used by farmers, possibly 20 percent, has been "borrowed" under leasing arrangements with nonfarmers. The borrowed capital plus leased capital comprised about 30 percent of the total assets coming from external sources. When all purchased inputs are valued at their market cost, and other inputs such as owned capital and labor at their opportunity cost, the residual, when allocated equally between labor and owned capital, showed a downward trend (Figure 10.1). The rate of return for all capital used exceeded the interest rate paid on borrowed capital until 1954. After that, the rate fell to 3.5 percent, which is below the interest rate. Thus, part of

<sup>13</sup> J. Z. Rowe, "Sources and growth of agricultural credit," *Business Rev.*, Vol. 44, No. 11, Nov., 1959.

<sup>14</sup> Calculated from data found in *The Farm Income Situation*, AMS, USDA, Sept., 1959 and *Current Developments in the Farm Real Estate Market*, *op. cit.*





Source: William H. Scofield, "Returns to productive capital in agriculture," Current Developments in the Farm Real Estate Market, ARS, USDA, Feb., 1960.

Fig. 10.1. Changes in rate of return on market value of capital used in farm production, U. S.

the return (opportunity return) to family labor and owned capital must be used to pay the cost of borrowed capital.<sup>15</sup>

When the operator and family labor and nonreal estate capital are paid at their cost, the residual — which is the return to real estate capital valued at current values — also shows a decline, following the pattern of return to all capital (Figure 10.1). It seems that sufficient pressure will be exerted to reduce the rate of increase in land values and to bring about an adjustment in the land return-market value ratio.

<sup>15</sup> William H. Scofield, "Returns to productive capital in agriculture," The Farm Real Estate Market, ARS, USDA, Washington, D. C., Feb., 1960.

# Discussion

JOHN BLACKMORE \*

Change seems to be the only constant in American agriculture. Redman presents the main elements of this process of change. The essence of this change seems to be the continual adjustment of the factor mix by entrepreneurs as they pursue a profit-maximizing position. Confronted by changes in product and factor markets and offered improvements in production technologies, American farmers seem to show less and less reluctance to alter their production combinations. American farming has moved very far from the traditional peasantry model of a farm as a relatively fixed combination of land and human labor. The farmer has come to treat more and more of his productive resources as variables. Who knows but what we are approaching a time when farming decisions may really be made on the basis of an equilibration of marginal costs and returns?

In addition to the factors discussed by Redman, there is a growing significance in two other factors. The first of these is social capital, or public investment. In the Tennessee Valley public investment has produced both public controversy and economic good. I would suggest that public development of a source of cheap electric power does affect decisions as to location of some kinds of industrial plants and thereby contributes to economic development. Also, the impact of an improved waterway on the pattern of agricultural output should be noted. Feed grains move in very large quantities down the Mississippi River and up the Tennessee River to ports in northern Alabama. The grain is then trucked to poultry production centers in Georgia and Alabama from these ports. The impact of the Georgia broiler industry is well known, particularly in the Northeast. It would seem that the improvement of the Tennessee River has given the Georgia and Alabama poultry producers a real economic advantage over producers in some other parts of the country.

Another kind of public investment is less direct, but equally effective. This is the very large investment which this country has made in technical education. We take for granted that we can have a large crop of technicians available not only to carry on agricultural research, but also to provide a personal advisory service to farmers. We also take it for granted that a high school education is commonplace and that many farmers have the benefit of some college training in agriculture. We should contrast our situation with the rest of the world, where this process of social investment is only just starting. In the late 1950's in the Ministries of Agriculture of three countries in the Far East — Viet-Nam, Cambodia, and Laos — there was a total of nine men who had

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college degrees in agriculture. What kind of program of private investment in agriculture is practical where such a situation prevails? What can one recommend in the way of private capital use in the agriculture of southern Italy, Morocco, or fifty other countries where most farmers are either illiterate, or at best have access to four years of schooling?

The capitalization of agriculture should be viewed also in light of another process of change. For many years there has been a gradual transfer of elements of the production process away from the farm. In 1959 the ultimate consumer received a product which was the result of a whole series of production processes and to which the primary producer, the farmer, made only a relatively small contribution. We are witnessing a growth of efforts to give centralized management to sets of these processes. To some extent this integration is under the control of farmer-producers through cooperatives. A large part of it, however, is controlled by large corporate firms with ready access to large sums of investment capital. The result is that a new channel for farm investment has been opened, but it is one which may have profound changes on the nature and the organization of farming.

#### RAYMOND J. DOLL\*

Considerable emphasis is placed on the fact that the trend has been for farmers to substitute capital inputs for labor inputs. Redman emphasizes the point that productivity of labor depends upon the level of other resources that are combined with the labor inputs. He also points out that, "To attain optimum levels of productivity in farming, it is important that the quantity of capital be adequate both in relation to the labor supply and other inputs and that the kinds of capital be in correct proportion for the level and type of production." With a substantially more rapid rate of increase in the price of labor than in prices of other inputs, and the prevailing stock of technology that existed, farmers were encouraged to make these capital substitutions. Considerable emphasis is placed upon the fact that any forces which cause changes in price relationships or the nature of production possibilities can change the pattern of production and, thus, the types of inputs that are used.

Commercialization and specialization are expected to continue in the future. These developments almost certainly will result in a continuation of the trends toward farm enlargement, mechanization, and the use of larger quantities of nonfarm production goods such as fertilizers, insecticides, electricity, fuel, and biologicals.

Thus, in the future, institutions financing farmers probably will be called upon to make a larger total amount of credit available to a smaller number of farmers. This will create additional problems for many financial institutions. For example, the size of loan that commercial banks can make to an individual is controlled by federal and state

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banking regulations. Many banks do not have adequate capital structures for making the size of loan that is needed by our larger commercial farmers. This problem will become more difficult, and banks need to give thought to methods for solving it in the most satisfactory manner. Although other agencies may not have such limiting legal restrictions, they must be careful not to lend too large a proportion of their total assets to any one individual and, thus, subject themselves to potential financial difficulties.

Much emphasis has been placed upon the importance of making more credit available to farmers on a so-called intermediate-term basis. This implies that the need for intermediate-term financing is growing more rapidly than is that for financing as a whole. Although the need for intermediate-term credit probably is increasing, the rapid rate of increase in use of such production items as fertilizers, insecticides, electricity, fuel, machinery rental, and purchased feed suggests that the need for short-term financing is growing at an even more rapid rate. Regardless of the relative rates of growth in the different kinds of capital requirements, the important consideration in financing is that the credit extended be tailored to the requirements of the production plan and that financial institutions keep pace with the changing needs dictated by changing technology. This consideration is developed in more detail in Part III.

Redman states that in 1958 commercial banks provided 75 percent of the total nonreal estate credit; production credit associations, 16.5 percent; and the Farmers Home Administration, 2 percent. These data indicate that these agencies provide for 93.5 percent of nonreal estate credit and other sources the remaining 6.5 percent. According to data available, other sources were more important providers of nonreal estate credit. Data from the American Bankers Association and the Balance Sheet of Agriculture indicate that at the beginning of 1959 commercial banks provided 45 percent of the nonreal estate credit outstanding; individuals, merchants, and dealers, 37.8 percent; Farm Credit Administration, 12.9 percent; and Farmers Home Administration, 4.3 percent.



## **PART III**

# **Credit Market and Institutions**

- ▶ **Credit Supplies — Present and Future**
- ▶ **Relationship to Commercial and Low-Income**
- ▶ **Evaluation**
- ▶ **Suggested Improvements**





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## *Farm Credit Institutions*

**F**OLLOWING THE FINANCIAL CRISIS on farms in the early thirties, far-reaching changes were made in our agricultural credit institutions and methods. What has been the result of these changes and how well has our farm credit system functioned since?

First on the list for critical evaluation are the credit institutions themselves, both operating and real estate loan agencies. What has been happening to these institutions and in what direction are they moving? Second, how well have these agencies been meeting the financial ups and downs of the farmers, especially the difficult times that farmers have been having during the squeeze of rising costs and falling or stationary returns? Finally, what progress, if any, has been made in more efficient handling of farm credit and in lower loan costs? Tootell addresses himself to similar questions in Chapter 17.

### CREDIT INSTITUTIONS

Farm credit has increased substantially since the thirties, and the agencies extending the credit have improved their types of loan service to farmers. However, further improvement in loan services is needed. This subject is also discussed in Chapters 13, 15-18. In discussing these developments, operating credit agencies will be considered first, followed by real estate or farm mortgage agencies.

#### Institutions for Operating Credit

Commercial banks are the most important source of operating credit for farmers. While the Production Credit Associations and the Farmers Home Administration are of lesser importance, there is a host of merchants (including equipment, fertilizer, feed, and fuel dealers), as well as private individuals, who also provide farmers with operating credit. But these merchants and private individuals are not organized as credit institutions, and consequently are not discussed in this chapter. (Some aspects of credit extension by farm supply agencies are discussed in Chapters 8 and 26.) Nevertheless, they should not be overlooked in any over-all treatment of the farm credit problem.

Table 11.1. Operating Credit to Farmers by the Major Credit Institutions Outstanding on January 1, in Selected Years

Credit Institutions	1939	1946	1953	1960
(million dollars)				
Commercial Banks	789	1,034	3,195	4,819
Production Credit Associations	147	195	599	1,361
Farmers Home Administration	351	413	348	397
Total	1,287	1,642	4,142	6,577
(percent of total)				
Commercial Banks	61	63	77	73
Production Credit Associations	12	12	14	21
Farmers Home Administration	27	25	9	6
Total	100	100	100	100

Source: Based on data supplied by the Agricultural Research Service, USDA.

A comparison of the operating farm credit outstanding by agencies is presented in Table 11.1. Commercial banks have provided a major share of the additional operating credit to farmers. Since the end of World War II, commercial banks have increased their production credit advances (based on amounts outstanding January 1 of each year) by 3.8 billion dollars. Commercial banks on January 1, 1960, had over six times the total advanced as of January 1, 1939. It is interesting to note that the commercial banks not only increased their farm production loans in the 1946-53 period, but also in the 1953-60 period. In the single year ending January 1, 1960, loans extended by these banks increased by 658 million dollars.

Production Credit Associations, created by Congress in 1933, had 147 million dollars in outstanding loans on January 1, 1939. By the end of World War II their loan total had increased to 195 million dollars. In the next fifteen years, PCA loans increased rapidly. On January 1, 1960, total outstanding PCA loans amounted to 1.36 billion dollars. This amount was greater than the commercial banks had outstanding on January 1, 1946. On January 1, 1960, the Production Credit Associations had about one-fifth of the total operating credit advanced by the three main types of farm credit agencies. It is significant that the PCA's had their largest percentage increase during the 1953-1960 period. This is the period in which the "cost-returns squeeze" hurt the farmer most. The banks extended additional credit, and so did the PCA's. If the banks should find it difficult to continue expanding, the PCA's are available. This is a natural situation since banks have a primary obligation to their depositors and may find it necessary at times to curtail their loans in order to provide adequate reserves behind their deposits.

The Production Credit Associations do not have deposits; they obtain their funds for lending from the Federal Intermediate Credit Banks, who in turn get the funds from the central money markets on



short-term debenture bonds or notes. This gives the PCA's a continuous open line of credit to extend to farmers as long as the Federal Intermediate Credit Banks can borrow from the central money markets.

Thus, in the commercial bank-PCA combination, the farmer is assured of credit as long as funds are available in the money markets, and there are few times that funds cannot be obtained in the money markets on securities with a reputation as good as that enjoyed by the Intermediate Credit Bank debentures. But in order to make this combination operate smoothly, the PCA's have to assume an obligation to fill in the gap wherever and whenever commercial banks find their funds loaned to capacity. Since PCA's cover the entire nation, it is obvious that the combination of available credit at all times can work if the PCA's are willing to take up the slack left by the commercial banks.

An interesting phase of the Production Credit Associations' activities is the relatively large business in the South. There are two states, South Carolina and Florida, where Production Credit Associations had more operating loans outstanding on January 1, 1959, than the commercial banks. The four states having the largest and the four having the smallest percentage of PCA loans in comparison with the commercial banks are presented in Table 11.2. All of the "high percentage PCA

Table 11.2. PCA Operating Loans Compared in Percentage Terms  
With Total Operating Loans of PCA's and Commercial Banks,  
January 1, 1959

Largest percent		Smallest percent	
South Carolina	56	Iowa	7
Florida	52	Arizona	7
North Carolina	46	Nebraska	10
Mississippi	44	California	12
U. S. Average	20	U. S. Average	20

Source: Farm Credit Administration, Washington, D. C.

states" are in the South and east of the Mississippi River. All of the "low PCA states" are in the West. Part of the explanation for this situation is that the small loans in the South are not actively sought by the banks. For example, the average PCA loan in South Carolina in 1958 was \$3,150, while the average size in Iowa was \$16,500. But this is not the only reason, as indicated by the average PCA loan of \$10,900 in Florida. Actually the PCA has an advantage because it can take larger loans than many commercial banks.

Another aspect of the nature of PCA loans is provided by examining the percentage of farmers served by the PCA's (Table 11.3). Iowa is the only state which appears low in both the PCA-bank comparison and the percentage of farmers served. Contrary to what might be expected, West Virginia and Alabama—both southern states—rank low on the list, while the high percentage states include eastern and western states not present in the states having a high percentage of PCA credit as

Table 11.3. Estimated Percentage of Farmers Using PCA Credit, January 1, 1959

Four high states		Four low states	
(percent)		(percent)	
Vermont	15	West Virginia	2
Montana	12	Alabama	3
Idaho	12	Iowa	3
Delaware	11	Wyoming	3
U. S. Average	6	U. S. Average	6

Source: Farm Credit Administration, Washington, D. C.

compared to commercial banks. Information on credit supplied by merchants and dealers is needed to explain this situation. This type of credit is especially important in the South. Although the PCA's provide more credit than do banks in South Carolina and Florida, they actually reach only an estimated 7 percent of the farmers in South Carolina and 6 percent in Florida. Consequently, both the banks and the PCA's have much room for expansion.

Farmers Home Administration loans have remained relatively constant since 1939, actually declining slightly since the peak in 1946 (Table 11.1). These loans are of several different types. For example, emergency crop and feed loans made up a sizable part of the total in 1939 and 1946, but in the years since have almost disappeared. In 1939 there were 171 million dollars in these emergency crop and feed loans outstanding, while the total at the beginning of 1959 was less than 6 million dollars. On the other hand, operating loans made by the FHA were up from 169 million in 1939 to 340 million in 1959.

The increase in operating loans by the FHA is a major success in that it has demonstrated that supervised credit will work if restricted to operators who possess managerial ability. Part of the success, of course, is due to the quality of the supervision. When it is recognized that the borrowers of the FHA operating loan have to be turned down by a commercial bank or a Production Credit Association before they are eligible, it makes the good repayment record on these loans stand out as one of the achievements in farm credit. It is this achievement which points the way to what may be one of the newer developments in farm credit among banks and Production Credit Associations, namely, the development of the "farm management" loan (cf. Chapters 13, 15, and 16).

Evaluation of institutions for operating credit. Farmers are well supplied with operating credit institutions. Commercial banks which offer checking account services and a variety of other banking facilities in addition to loans top the list in number of units and in amount of credit provided. Production Credit Associations which cover the entire country are in a position through their Federal Intermediate Credit Banks—which they are in the process of taking over—to provide a

relatively continuous source of operating credit, and especially to serve when commercial banks for one reason or another are unable to provide farmers with the credit they need. The PCA's, which are cooperatives, offer the farmer an opportunity to participate in a credit organization to supply his own operating capital. Finally, for those farmers not able to get credit at either a bank or a PCA, the FHA is available with a short or intermediate operating loan. This is a supervised loan carrying a relatively low rate of interest. In addition, the FHA provides emergency and disaster loans. But most important, the FHA has demonstrated with its operating loans the successful use of supervision in making loans to farmers whose credit rating is below that accepted by commercial banks and PCA's.

### Real Estate Credit Institutions

Insurance companies, Federal Land Banks, commercial banks, and the Farmers Home Administration, in this order, are the principal real estate mortgage lenders on agricultural land. The record of these agencies in the holding of farm mortgage loans is presented in Table 11.4.

Table 11.4. Farm Mortgage Holdings of Major Institutions Making Loans to Farmers on January 1, in Selected Years

Credit Institutions	1939	1946	1953	1960
(million dollars)				
Insurance Companies	983	892	1,716	2,834
Federal Land Banks	2,863	1,319	1,095	2,357
Commercial Banks	519	508	1,105	1,638
Farmers Home Administration	10	185	268	449
Total	4,375	2,904	4,184	7,278
(percent of total)				
Insurance Companies	23	31	41	39
Federal Land Banks	65	45	26	32
Commercial Banks	12	17	26	23
Farmers Home Administration	--	6	7	6
Total	100	100	100	100

Source: Based on data from Agricultural Research Service, USDA.

Insurance companies have increased their farm mortgage holdings almost three times since 1939. Since 1946 they have more than tripled their holdings. On the other hand, the Federal Land Banks have a smaller total than in 1939, but they have more than doubled their holdings since 1953. Commercial banks, like insurance companies, have more than tripled their holdings since 1946.

The Federal Land Banks came out of the 1930's with large holdings



of farm mortgages because other lenders were not interested or were unable to lend extensively on farm real estate. Although Federal Land Banks do not have any government capital, they do have a public responsibility in the farm mortgage field (cf. Chapter 17). Congress created these banks to lend solely on farm real estate, provided the original capital, and gave them generous financial support during the 1930's. If farmers should meet serious financial troubles again, Congress would undoubtedly see that the Federal Land Banks had the necessary support to keep farm mortgage credit flowing to deserving farmers.

On the other hand, insurance companies adjust their investments in farm mortgages not to the needs of the farmers but to the current investment policies of their companies. If they have large sums to invest and want more farm mortgages in their portfolios, they may expand their farm loans. But if they are short of investment funds or decide they want fewer farm mortgages, they may stop making farm loans, i.e., they have no obligation to make farm loans. However, insurance companies have been an excellent source of farm mortgage credit over the years, especially in the Midwest where large low-risk loans are available. Competition between insurance companies and other lenders for farm mortgage business has been of distinct advantage to farmers in areas where insurance companies have actively sought loans.

Commercial banks are in somewhat the same situation as insurance companies. Their major responsibility, as noted previously, is to their depositors, secondarily to their short-term borrowers, and lastly to long-term borrowers—and this is as it should be.

Another group of lenders, not shown in Table 11.4, are former farm owner-sellers who in the sale of their farms take a farm mortgage from the buyer as major payment for the farm. These lenders provide a valuable and outstanding service because they are able to adjust their terms to accommodate buyers. Many a farm buyer would not have been able to make the purchase had it not been for a seller who could lend a larger percentage of the purchase price than the insurance companies, Federal Land Bank, or commercial banks would lend. As for the FHA, there are limits on the funds it has available for direct loans, and in addition there are restrictions on the total amount it can lend to any one buyer, which prevents it from serving more than a small number of tenant purchasers.

The Farmers Home Administration, however, does provide an unusually fine loan service for the relatively few tenant buyers it is able to handle. As is evident in Table 11.4, it has been holding its own in extending about 6 percent of all the farm mortgage credit granted by major agencies. The FHA has set up a supervised purchase plan for both direct and indirect insured farm-ownership loans that has turned out to be much more successful than many expected. With the FHA making direct loans up to 100 percent and insured loans up to 90 percent of the purchase price, there were many predictions of failure for this high risk program in its early years. Two major policies, however, prevented these predictions from becoming fact. One was a limitation

on the funds for the 100 percent loans. With this restriction, the FHA was able to select those most likely to succeed from a large number of applicants. Secondly, the FHA held the appraisal and automatically the purchase price of the farm at a figure which was justified in terms of the estimated earning power of the farm.

Evaluation of farm mortgage institutions. Here and in previous chapters it has been demonstrated that farmers are well supplied with farm mortgage agencies. The situation is much like that in the operating credit field with one agency which can keep going in an emergency. In the operating credit field, it is the PCA, and in the farm mortgage field, it is the Federal Land Bank. Federal Land Banks, like PCA's, are not government agencies, but they were set up by Congress to cover the entire country and to provide credit at all times, especially during critical periods when other lenders are not able to satisfy all legitimate credit requests.

Insurance companies, the largest lenders in the field, are a good source of competition even though they do not have an obligation or responsibility of providing continuous service in any area. The Farmers Home Administration provides a relatively small amount of farm mortgage credit, but it has been successful in this area with capable tenant buyers.

## LOAN SERVICE

The big question in short- and intermediate-term lending is how to make "farm management" loans. There are still too many loans made to farmers strictly on a security basis. If the farmer has the livestock, the feed, the equipment, the lease, or the equity in his farm, he gets the loan. A "farm management" loan, on the other hand, is designed specifically to raise the income level of the farmer (cf. Chapters 13 and 15). It is made only after an intensive study of the farmer's organization and operations. The farmer may apply for a \$3,000 loan for operating expenses, but after a mutual study of the business by the lender and farmer, a program may be agreed upon which calls for a total budget loan of \$4,000 to expand a livestock enterprise and a fertilizer program, and to carry out reorganization of the cropping system.

The new techniques in linear programming, along with increased emphasis on farm records, should be tied in with farm lending. Just as the budget loan has been recognized as a big advance since 1935, so it is possible that the farm management loan will become one of the new developments of the sixties.

In the long-term credit area there is a similar need for farm management lending. The farmer who wants to buy an adjoining tract to add to his farm should have an analysis made before making the decision. Similarly, a prospective farm owner who is thinking of purchasing a 200-acre unit should have a farm management analysis completed before closing the deal. In buying a farm one expects to get an

abstract and have it examined to see if the title is good. Also, it is wise to have an appraisal made to see how valuable the property is. Why not invest in a farm management analysis to determine the profit possibilities of the farm as a productive unit? Diesslin examines this question in more detail in Chapter 13.

It is evident that the new farm management approach has great possibilities when tied in with credit. The first area in which this combination might develop extensively could be in specialized loans like those for fertilizer, feed, and equipment. In these specialized loans the analysis would be relatively easy, and there would be a selling agency interested in providing the service in connection with the sale of the fertilizer, feed, or equipment. Eventually all lenders should be interested in providing farm management loans since lenders as well as farmers would gain from their use.

### EFFICIENCY AND LOW COST

A final consideration is the possibility of greater efficiency in getting credit to the farmer with lower cost as the result. This may sound like the reverse of the preceding section where additional analysis which would probably add to the cost was discussed. The objective here is efficiency and low cost for all types of loans. For example, we are interested in efficient low-cost farm management loans as well as low-cost renewals of well-secured real estate loans and short-term loans to hold grain in storage.

Chief concerns in this instance are volume, sources of funds, and risk. The loan agency will probably find that its costs in making loans will be closely tied to the size of the loan. This is a factor that is too often ignored. Small loans are very costly to make. Many farm credit specialists have written high-sounding phrases against high interest rates. In some instances the attacks have been justified, but in other instances if these specialists had studied the size of the loans, they would have discovered that the major reason for the high interest was the small size of the loans. The high rates for small loans that are legal in most states are in recognition of the high cost involved in making this type of loan.

The second factor is source of funds. Access to low-cost credit in the central money markets has been a major achievement beginning with the Federal Land Banks in 1917 and with the Federal Intermediate Credit Banks in 1923. This has made farm credit competitive and sensitive to credit cost changes. For example, it not only brought the low rates of the forties out to the farmer, but it also brought the high rates of 1959. In the long run this is good, giving the farmer a somewhat lower over-all credit cost than if he did not have this indirect access to the central money markets.

Third, and finally, is the risk factor. To bring this difficult feature under control, insurance is being used more extensively. Examples



are the Federal Crop Insurance program, the growing practice of using life insurance tied in with all kinds of loans, and insured farm mortgage loans by the Farmers Home Administration. Farm credit in the past has often been denied because of the risk involved. However, the fact is being more widely accepted that the pooling of risks can be handled efficiently and economically by insurance. In the future this technique will undoubtedly be expanded greatly to make credit available where it is not available now, and it may be used in cases where it is now too expensive to make loans. One of the opportunities for insurance may be that of small loans where some form of insurance may be substituted for much costly time and travel. What losses do occur with these small loans would be covered by a small insurance fee. In all probability the major attack on loan cost will be, as it has been in industry and merchandising, in cutting down on labor and using it more efficiently.

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## *Prospects for Credit Supplies to Agriculture Under Continued Economic Growth*

IT IS ASSUMED that the basic trends evident in the agricultural sector during the 1950's will continue in the 1960's, viz., declining agricultural labor force and farm population, declining number of small commercial farms, increasing average size of commercial farms, increasing investment (in real terms) and output per agricultural worker, and increasing income of the farm population from nonagricultural sources (cf. Chapter 6). Also, the authors assume that the total supply of credit in the economy will be tailored to the appropriate over-all requirements for continued economic growth, and that the availability and cost will vary in response to changes in the aggregate demand for credit.

The prospective supply of credit to agriculture under these conditions will depend upon (1) the intensity of demand for agricultural credit as compared with demands from other sectors in the economy (basically, the productivity of credit in agricultural uses as compared with productivity in other uses) and (2) the efficiency with which the demand is transmitted to all the major sources of credit supply—that is, the effectiveness of the “credit machinery” available to farmers for obtaining credit.

### PROSPECTIVE DEMAND FOR AGRICULTURAL CREDIT

The demand for farm credit is affected by many factors. One important factor is the supply of equity capital. Although total farm debt has increased rapidly and persistently since the end of World War II, the major portion of the capital (including land) used in agriculture is represented by equity—not creditor—claims. Total farm debt was equal to about 12 percent of the physical farm assets in 1950 and 14 percent in 1959. While creditor claims probably will increase further relative to the value of agricultural assets (if for no other reason, because of a slower rise or possibly a decline, in price of farm real estate), there appears to be no reason to expect large or revolutionary changes in the sources of capital used in agriculture.

<sup>1</sup> Views expressed in this chapter are those of the authors and do not necessarily represent those of the Federal Reserve System.

While the average size of commercial farms is expected to increase further, possibly at a faster pace than during the 1950's, most farms will probably continue to be described as "small businesses." Typically, small businesses have shown relatively high rates of births and deaths of firms, with inadequacies of management and the difficult problem of providing continuity of management ranking high as causes of failures. Equity, therefore, will probably continue to constitute the major portion of capital for small firms, supplemented with limited amounts of credit. The rather intensive study of problems of small business has indicated that, while credit availability was a problem, it was not a major cause of failures or slow rates of growth.<sup>2</sup>

Furthermore, the total capital in agriculture appears to be in excess of the optimum amount, as compared with alternative uses of capital in the economy. Hence, the prospective need is not that of attracting additional capital to the industry in the adjustment process, but rather of providing for effective and efficient transfers of ownership of assets to fewer but larger units and conversions of capital among various kinds of assets. The return to capital used in agriculture is estimated to have averaged 6.6 percent during the first half of the 1950's but only 4.6 percent during the second half (3.5 percent in 1959).<sup>3</sup> At the end of 1959 the typical interest rate on new long-term mortgages was 6 percent or more, loans to prime business borrowers were being made at 5 percent, and government bonds in the intermediate sector were priced to yield in excess of 4 percent. Common stocks, however, were showing average yields of about 3-1/4 percent, somewhat comparable to the return on farm capital.

A situation in which market prices of agricultural assets are rising and rates of return to farm capital are declining is not likely to continue indefinitely. In fact, these trends appeared to be undergoing modification in 1960. Since supplies of agricultural commodities appear likely to continue to be superabundant for the foreseeable future, there is not much prospect that aggregate return to capital in agriculture will rise. Thus, any increase in the average rate of return would likely be associated with a decline in the aggregate amount of capital in agriculture and in price of one or more of the agricultural assets. This, in turn, would probably affect the flow of capital into the industry.

The current level of farm debt relative to value of farm assets would permit a further significant rise in debt, even in the face of stable or falling farm income, if the owners of farm assets desire to use additional credit. However, at some level the flow of capital into agriculture from both equity and credit sources would probably be retarded as debt rose further relative to both value of assets and income. Any slowing of the flow of capital into the industry would probably reflect

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<sup>2</sup> Financing Small Business, Report to the Committees on Banking and Currency and the Select Committees on Small Business of the United States Congress by the Federal Reserve System, April 11, 1958, p. 132.

<sup>3</sup> Current Developments in the Farm Real Estate Market, July-November 1959, ARS, USDA, Washington, D. C., Feb., 1960, p. 23.



reduced demand for new capital due to low returns on capital and reduced willingness of agricultural credit agencies to supply additional credit as repayment prospects deteriorated. Thus, the prospective trend of farm income and supply of equity capital is likely to have an important effect on both the demand for and supply of agricultural credit.

The institutional arrangements through which equity capital is provided to individual farms may change more than the institutional arrangements through which credit is made available. One of the major needs in agriculture is for the consolidation of holdings into larger operating units (cf. Chapters 6 and 7). This adjustment has been retarded because of the strong desire of the owners of farm real estate to retain assets in that form, reflecting concern about inflation and the use of farm real estate as a good "inflation hedge." This attitude is likely to continue into the 1960's and possibly much longer. Such attitudes are not easily reversed. Hence, if the consolidation of holdings is to be accelerated, arrangements which would achieve consolidation for operating purposes without the necessity of transferring ownership could prove very helpful. Raup developed this point in Chapter 9. The institutional arrangements which would appear to merit additional attention in this respect include the joint ownership of farms, possibly through the corporate form of organization, leases, rental contracts, and labor-share agreements. An expanded role for these kinds of arrangements would tend to reduce the need for credit to finance transfers of ownership. Thus, the expansion of farm real estate debt, based upon transfers of land which in 1959 was priced so high as to yield a return of only about 3 percent, would be held to a minimum.<sup>4</sup>

It is possible also that institutional arrangements which would facilitate the provision of nonreal estate capital to farm businesses from equity sources other than that of the farm operator may see a significant growth. Both farm machinery and livestock—two of the important forms of capital for many farm operators—would be candidates for such arrangements. In some areas leasing or rental arrangements are provided on farm machinery, usually for specialized types of machines, not unlike those which are relatively common for transportation and construction equipment. Livestock—both breeding herds and feeder stock—can be provided to individual farms by owners other than the farm operator. If these kinds of arrangements should come into widespread usage as the average size of farm continues to increase and the capital invested per farm worker continues to rise, the aggregate demand for agricultural credit by farmers might be reduced.<sup>5</sup> However, in order to attract this kind of equity capital, the return must be high enough to compete with alternative investments. The rate of return to suppliers of such capital possibly would be greater than the return on equity

<sup>4</sup> Current Developments in the Farm Real Estate Market, July-November 1959, ARS, USDA, Washington, D. C., Feb., 1960, p. 24.

<sup>5</sup> The demand for credit by suppliers of farm machinery, materials, and services, and by other participants in the provision of capital to agriculture, probably would increase.

capital of the average farm operator. This would be true if the suppliers are able to achieve economies in processing or distribution operations because of the nature of investment, or if they can bring superior management skills into the farm operation.

### CREDIT MACHINERY AVAILABLE TO FARMERS

The credit machinery available to serve agriculture appears to be adequate as to both the number and kinds of facilities, and gives evidence of being fairly good with respect to quality of service (cf. Chapters 15-18). Commercial banks, through branch and correspondent banking, have the potential to tap credit supplies available anywhere in the commercial banking system.<sup>6</sup> The kinds of agricultural activities which utilize the largest amounts of credit tend also to be those in which the participation of correspondent banks has shown the greatest development. Feeder cattle and ranch loans, and loans to help finance relatively large-scale production of fruits, vegetables, and field crops, as well as the processing and marketing of such crops, frequently are provided directly from large banks located far from the producing areas or through participation in loans made by local banks (cf. Chapter 16).

However, agriculture is by no means dependent entirely upon commercial banks for access to the national credit market. Nonreal estate credit is provided also through the Production Credit Associations. The Production Credit Associations have access to the national credit market through the Intermediate Credit Banks and can channel into any agricultural community almost any amount of nonreal estate credit that is desired by farmers who qualify for such credit and are willing to pay interest rates which cover the cost of obtaining the funds. The cost of such credit includes the interest rate on the debentures issued by the Intermediate Credit Banks, plus the cost of "retailing" such credit to farmer borrowers. Thus, the Production Credit Associations and Intermediate Credit Banks provide a means of assuring that credit is always available to qualified borrowers at a "competitive" price.

As to credit secured by farm real estate, a significant amount is provided by commercial banks, but larger amounts are provided by life insurance companies and the Federal Land Banks. Murray presents data on this subject in Chapter 11.

A number of life insurance companies invest a portion of their funds in farm real estate mortgage loans and, in the aggregate, are an important source of long-term agricultural credit. The investment officers

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<sup>6</sup> The results of a survey of loans of commercial banks in 1956 indicated that the number and total amount of agricultural loans in which two or more banks participated jointly were of importance at that time in only a few areas. This study was reported in *Farm Loans at Commercial Banks*, Board of Governors, Federal Reserve System, 1957. However, there appears to have been a large increase in the amount of such loans, especially in livestock areas, in 1958 and 1959 (cf. Chapter 13).

of these firms have available a variety of alternative outlets for their funds and will be strongly inclined to place the funds where the net return is believed to be most attractive, allowing, of course, for diversification, utilization of staff, and the like. Here, too, the credit available to agriculture must meet the competition from other borrowers, and the availability and cost will show some sensitivity to changes in the national credit picture.

These sources of private and cooperative credit are supplemented by the Farmers Home Administration which provides a variety of credit services to marginal borrowers, utilizing funds appropriated by the Congress and funds obtained from private investors on a guaranteed or insured basis (cf. Chapters 5, 11, and 14).

"Nonreporting" creditors, including dealers, merchants, finance companies, and others, are also important, accounting for more than one-third of nonreal estate farm credit.<sup>7</sup> Some of these creditors, such as large manufacturers and distributors of farm equipment and supplies and large processors and distributors of agricultural commodities, have access to national credit markets. Increasing numbers of these firms have organized credit subsidiaries to help boost sales of their products (cf. Chapter 13). Others have combined credit, managerial advice, and marketing services for the production of individual commodities into an integrated package and have made it available to farmers, as discussed in Chapter 8. Thus, credit from nonfinancial institutions is important in local areas in the financing of specific capital items or farm products, and could easily become more important if the traditional sources do not provide adequate credit service.

The quality of credit service, although improved significantly, can be expected to show further adaptation to the specific needs of individual farmers. Engberg discusses this important development in Chapter 15. Modifications in the institutional arrangements through which credit service is provided to agriculture may well be in response to opportunities to improve quality of service rather than any change in the over-all supply of farm credit. One trend which has been a source of some concern is the tendency for individual farms to draw upon credit from several sources. This largely precludes any individual lender from appraising, in cooperation with the farmer, the over-all credit requirements of the farm business and the schedule of relative productivity of additional capital in the various farm enterprises and the optimum scheduling of credit extension and debt repayment. However, if individual farmers were to rely upon one "station" for all their credit, and if these stations were organized and staffed in such a way as to be able to provide comprehensive credit service, these problems would be alleviated. Existing institutions, with some change in organization and viewpoint, appear to have the capacity to provide this kind of credit service. A similar view is expressed by Diesslin in Chapter 13.

<sup>7</sup> "The balance sheet of agriculture, 1959," Federal Reserve Bulletin, Board of Governors, Federal Reserve System, July, 1959.



## POSTWAR CREDIT POSITION OF AGRICULTURE

In the postwar period the amount of agricultural credit outstanding has increased rapidly, reflecting both strong demand for and ample supplies of credit. From 1946 to 1950, debt secured by farm real estate increased by a relatively small amount (15 percent) while nonreal estate farm loans held by principal lending institutions (excluding loans guaranteed by the Commodity Credit Corporation) increased more than two-thirds and loans extended by nonreporting creditors more than doubled (Table 12.1). In the decade 1950 to 1959, debt outstanding to

Table 12.1. Farm Debt Has Increased Relatively More Than the Value of Farm Physical Assets While Farm Income Declined

				Percent change	
	1946	1950	1959	1946- 1950	1950- 1959
			<u>billion dollars</u>		
Real estate debt	4.8	5.6	11.3	17	102
Nonreal estate debt to:					
Major lending institutions	1.7	2.8	5.8	65	107
Nonreporting institutions	1.2	2.4	3.7	100	54
Commodity Credit Corporation	0.3	1.7	2.5	467	47
Total farm debt	8.0	12.5	23.3	56	86
Proprietors' equity	94.0	118.3	179.8	26	52
Total farm physical assets	82.2	107.1	171.0	30	60
Income of farm population from agricultural sources	17.0	15.7	13.6	-8	-13

Source: Economic Report of the President, Jan., 1960, pp. 166, 210, 229, 236; Agricultural Outlook Charts, 1960, AMS, USDA, Washington, D. C., p. 55.

the first two groups of lenders more than doubled while loans by nonreporting creditors have increased about 50 percent.<sup>8</sup>

Commercial banks are by far the largest sources of nonreal estate farm loans (cf. Chapter 11). During most of the period since the end of World War II, banks in rural areas have held small proportions of loans relative to total assets. However, this proportion has increased gradually and, in most areas, consistently. During 1960 the term "loaned up" was heard increasingly in some agricultural areas, especially in those areas in which cattle feeding is an important activity. In most agricultural areas, however, commercial banks still have had much "elbow room" to expand agricultural loans if the quality of the credit appears to justify such action.

The interest rates on agricultural loans made by commercial banks have not been as flexible as rates on securities or the rates on large loans to prime business borrowers. In part, this results from costs other than the "true interest" which are a relatively large part of the

<sup>8</sup> Agricultural Finance Review, ARS, USDA, Washington, D. C., July, 1959, pp. 144-45.

total cost of making agricultural loans. However, it is a reflection of the low loan ratios and a resulting partial insulation of agricultural credit from the swings in "credit ease and tightness" which have been most evident in the large financial centers. Thus, there has been a ready availability of credit to agriculture in most areas during most of the period since World War II, and at favorable interest rates compared with other sectors of the economy during periods of strong aggregate credit demand.

The apparent credit tightness for some would-be farm borrowers has been related more to their low equity position or lack of evidence of management skill than to the over-all credit supply. Woodworth and Fanning discuss this problem in Chapter 23. Not only has the interest rate at banks in rural areas been less flexible than elsewhere in the economy, but also banks in all sectors of the economy have had little inclination to vary rates on loans according to the risk involved. Since the safety of bank depositors' funds rests largely on the quality of a bank's loans and investments and the rates are geared to low loss ratios, there is little or no room in bank portfolios for high-risk loans. The experience with bank failures in the 1920's and the 1930's, the policies of the supervisory agencies, and the desire of individual bankers to protect their personal capital and the deposits of their customers restrict most bankers from intentionally making high-risk loans even if there were a strong demand for such loans from borrowers in low-equity positions.

Interest rates of PCA's and the FLB's have been possibly more flexible than those of rural banks, though limited by competition with the banks and other lenders. Yet even in this case agriculture has had ready access to credit since securities of the Farm Credit Administration have enjoyed favorable reception in the capital markets with only small premiums over rates for government securities. In addition, there has been strong competition among lenders for farm real estate loans, with the result that upward adjustments in rates have been limited and deferred during periods of rising rates in the national market.

All these credit agencies restrict their lending, by and large, on the basis of the amount of equity capital of the borrower, modified somewhat by other factors, including prospective earning capacity and character. But agriculture has again been in a favored position because the Farmers Home Administration makes a limited amount of loans at favorable terms to selected borrowers who lack equity capital and cannot obtain credit elsewhere. It is questionable whether this type of additional credit supply to agriculture should be expanded, in the present context of agricultural surpluses.

A review of the experience in the postwar years indicates that agriculture has been in a sheltered and relatively favorable position with respect to both availability and cost of credit, especially during periods of monetary restraint. The major factors have been the abundance of credit resources at country banks and the favorable institutional provisions for financing agriculture.

## PROSPECTIVE CREDIT SUPPLIES TO AGRICULTURE

The thesis advanced in this chapter is that the prospective credit supplies to agriculture are likely to be adequate for the expected demand. This conclusion is reached even though the preferential position of agriculture's access to credit has diminished and, under conditions of continued economic growth, probably will diminish further in the 1960's. The basic reason behind this preferential position has been insulation of commercial banks in rural areas from changes in credit conditions in the large financial centers. However, as loans at rural banks reach a large proportion of total assets, the need for tapping credit supplies elsewhere leads to a much greater sensitivity to credit conditions in the rest of the economy. If trends continue in agriculture and commercial banks continue to provide effective credit service, especially for the larger farms, branch banking and correspondent banking arrangements probably will see further development, as suggested by Hopkin in Chapter 16. This may be necessary to enable small banks in rural areas to serve relatively large customers and to assure that pools of credit stringency and credit abundance do not exist simultaneously in different areas. If the need for additional supplies of credit causes commercial banks in rural areas to become more flexible in their interest rate policy, the restraints on interest policy of other agricultural lenders in competition with banks would be lessened.

The volume of agricultural loans at rural banks is limited by (1) the amount of deposits these banks can attract and retain, (2) the ability to increase loans as a proportion of the total assets of the banks, and (3) the alternative demands for credit at these banks. In the postwar period (1948-59), deposits of rural banks have not risen proportionately as much as have farm loans, though in absolute terms the increase in deposits has been much greater.<sup>9</sup>

Perhaps of greater importance is the faster rate of growth of bank loans other than agricultural loans in this period. In all but four states, agricultural loans declined as a proportion of total loans. This may be due in part to the relative decline in importance of the farm population and agriculture within the economy, a higher rate of return on alternative types of loans (e.g., consumer installment loans) and the diffusion of nonagricultural activity into areas served by "agricultural banks" as

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<sup>9</sup>The available data do not provide a classification of banks which can properly be called rural or agricultural banks for purposes of analysis of deposits and ratios of loans to assets. Possible groupings include state banks insured by the Federal Deposit Insurance Corporation which are not members of the Federal Reserve System, all state banks, or all operating banks. None of these groupings of banks have uniformly high ratios of agricultural loans to total loans in all states. No grouping in the New England, mid-Atlantic, Florida, or the West Coast regions had a high proportion of agricultural loans to total loans, so those states were not included in the analysis. In each of the remaining regions, those groupings which had sizable proportions of agricultural loans to total loans were included in the analysis. All groupings had proportions of 15 percent or more in each region, though proportions in individual states fell short. These also included a relatively large proportion of all bank loans to farmers in each region, 40 percent or more, though proportions in individual states fell short of this level.



June 30 or nearest call report date for banks; June 30 for Production Credit Associations.

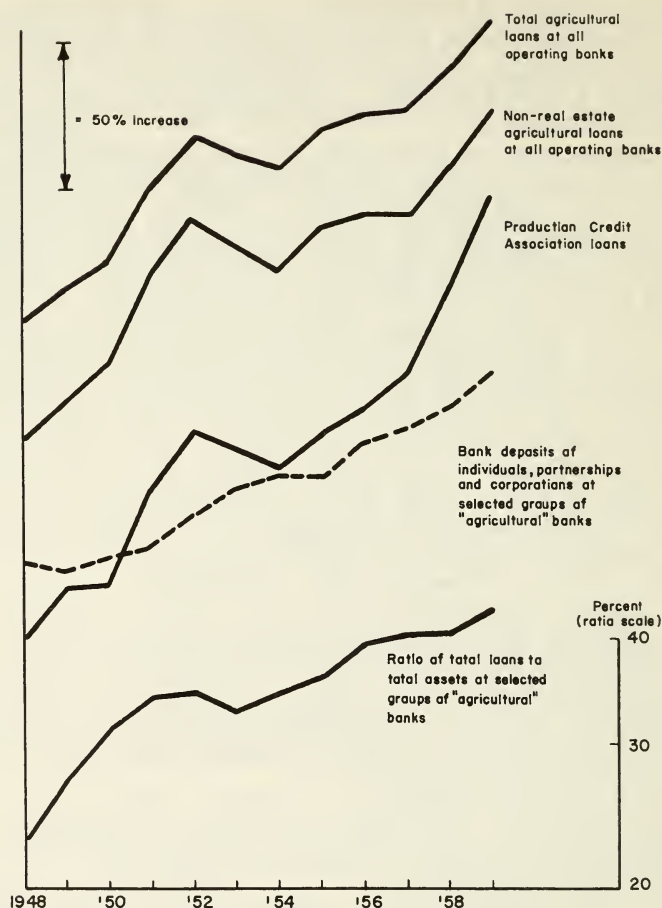


Fig. 12.1. Agricultural loans outstanding, bank deposits, and bank loan ratios in 31 agricultural states.

defined in the study cited in footnote 9. It appears that the diffusion of activity is merely a corollary to the relative decline of the agricultural sector of the economy.

Throughout the postwar period, the faster rate of increase in loans than in deposits at the agricultural banks included in this analysis has resulted in an increase in the ratio of loans to assets (Figure 12.1). In 1948 the ratio was below 23 percent, and by 1959 it was more than 42 percent. While this is not a high ratio compared with periods such as the 1920's, if this trend were to continue, it would have important implications for the prospective supply of agricultural credit.

Deposits at agricultural banks have increased steadily in most regions since 1949. Only in the Great Northern Plains was there a small decline in the mid-1950's, though in Texas, Oklahoma, and the Mountain states the rate of increase slowed noticeably. It is important to note that these regions were affected by drought at that time and also experienced a sharp reduction in cattle prices. Yet, total deposits were affected only modestly. If continued economic growth is assumed, it would be reasonable to expect continued growth of deposits in these banks though perhaps at a slower rate than in the country as a whole.<sup>10</sup>

While total agricultural loans of both banks and the PCA's have shown a strong general uptrend in the postwar years, the period from 1953 to 1957 was marked by a downturn and slow recovery. The same pattern was in evidence in all areas of the country with the exception of the Lake states, where there was almost no change from 1952 to 1954. The late 1950's have been marked by a rapid increase in agricultural loans in all areas, with the largest increases in the Corn Belt and Great Plains regions. These fluctuations in loan volume have been closely related to changes in net farm income and, especially in the Corn Belt and western range areas, to changes in cattle prices.<sup>11</sup>

With the prospect of farm income continuing at low levels under the heavy pressure of surpluses, any prospective increase in demand for farm credit would seem to be limited.<sup>12</sup> The rise in agricultural loan demand during the late 1950's has been in response to the unusual increase of farm income in 1958 (which in turn brought optimistic expectations and enlarged purchases of farm capital items) and the increase in cattle prices and numbers during the upswing in the current cattle cycle. These phenomena are not likely to be repeated soon, and therefore the strong demand for farm loans cannot be expected to continue. In view of the dim outlook for farm income, it is unlikely that farm loans can maintain a rate of increase even as high as the trend in the postwar period.

It is recognized, of course, that the impact of modern agricultural technology means capital requirements of individual farms will continue to increase. This, together with increasing mechanization and larger amounts of nonfarm inputs, will expand credit needs of individual

<sup>10</sup> A study of the relation of deposits of rural banks to cash receipts from farm marketings in the Seventh Federal Reserve District, 1924-40, indicated a relatively high sensitivity of deposits to changes in farm income: Business Conditions, Federal Reserve Bank of Chicago, Aug., 1948. This relationship is still evident for selected agricultural banks, but for the same groups of banks used in 1924-40 it had largely disappeared for the period 1946-58 — a further indication, no doubt, of the diffusion of nonagricultural activity into rural areas.

<sup>11</sup> Both farm income and cattle prices reached peaks in the early 1950's. A major break in cattle prices came in the winter of 1952-53 and brought a decline in farm loans in the areas where cattle financing is important. The rise in cattle prices and the expansion in cattle numbers in 1957-59 were accompanied by a rapid rise in loans in these same areas.

<sup>12</sup> It is assumed that the demand for farm products will not be increased by war or natural catastrophe, and also that public expenditures for support of farm prices and incomes will not increase materially. The adoption of strict and comprehensive production controls is not anticipated. Under these conditions, farm incomes can hardly be expected to rise significantly in view of the vast production potential of our agricultural plant and the inelastic nature of demand for farm commodities.

farmers (cf. Chapter 6). Furthermore, a rise in aggregate demand for agricultural credit can be expected whenever a rise in farm income improves expectations and brings increased purchases of capital items. But this would only modify the tendency for a slower trend in the growth of total agricultural loans.

Even though the deposits of agricultural banks will not be affected by farm income as much as will demand for agricultural loans, non-agricultural loans may be expected to continue expanding. Thus, the loan ratios of rural banks, even with the prospect of a slower growth of agricultural loans, are likely to continue upward under the assumption of continued economic growth. As agricultural banks reach the point where they need to tap outside sources of credit, the closer contact with financial centers will tend to make their lending policies more sensitive to developments in the money market.

In many agricultural areas, the cooperative agencies and other private lenders will continue to provide strong competition with the commercial banks. In addition, these banks will have an increasing number of investment alternatives available and, for most of them, the yield will be sensitive to the national credit market. Thus, it would appear that the availability and cost of agricultural credit in general will become increasingly sensitive to changes in monetary and fiscal policy and to shifts in supply and cost conditions in the national credit market. This should be the result if the credit machinery to which farmers have access is adequate and functions effectively, and that appears to be the situation. Under these circumstances, the availability and terms of agricultural credit should be quite comparable to the availability and terms in other sectors of the economy, allowing, of course, for investors' judgments as to relative risk and the retailing cost.

The important factors in the prospective regional demand for credit seem to be the income elasticity for different agricultural products, the shifts in population, and the shifts in agricultural production to those areas with the greatest comparative advantage under the impact of technological change. Livestock products and fruits and vegetables are expected to have the greatest consumer preference under the assumption of high and rising consumer income. These factors, together with the prospect of further westward migration of population, would indicate in the future a stronger demand for agricultural credit in the Corn Belt and the West than in other regions.



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## *Evaluation of the Credit Market and Credit Institutions*

**W**HAT IS HAPPENING on the financial front in agriculture? A close look at Table 13.1 quickly indicates windfall gains from inflation much like we've seen in the stock market and other ownership sectors of the economy. The same land base of 1940, with material improvements and more real estate added, of course, was worth nearly four times as much in 1960. Other farm assets have increased in value on a similar scale. Debts of farm operators have more than doubled—increased at about one-half the rate of increase in farm assets.

Table 13.1. Comparative Balance Sheet of Agriculture,  
January 1, 1940, and January 1, 1960

Items	1940	1960
	(billion dollars)	
<b>Assets</b>		
Real estate	33.6	129.1
Nonreal estate	15.2	56.1
Financial assets	4.2	18.4
Total	53.0	203.6
<b>Claims</b>		
Real estate debt	6.6	12.3
Nonreal estate debt	3.0	10.6
Commodity Credit Corporation	.4	1.4
Total	10.0	24.3

Source: The Balance Sheet of Agriculture, 1960, USDA Agr.  
Info. Bul. 232, Washington, D. C., Aug., 1960, p. 2.

Thus, the financial condition of the agricultural plant, in the aggregate, is extremely solvent. In no period since 1920 has the industry's financial health been so sound as during the 1950's. Assets nearly quadrupled and net farm income tripled while total debts only doubled from 1940 to 1960. Delinquency on indebtedness and foreclosures have been practically nonexistent. Rapidly rising land values have eliminated the need for foreclosures and offset any lending errors that may

have occurred. Windfall gains in asset values have removed some of the "sting" of depressed farm earnings. However, such gains are realized only on sale of the property or through the enlarged credit base provided.

Few of the credit problems anticipated at the close of World War II have materialized. Yet, always on the horizon is the possibility the situation may change. Certainly the strong financial condition of the industry has helped agriculture weather the cost-price squeeze.

### CHANGING CREDIT CLIMATE

Agriculture is faced with higher interest rates, rising taxes, and lower farm earnings. The result at some point must be lower farm real estate values. It is all but certain that this point has been reached. Farm real estate values have continued to rise despite falling net farm income as follows:

	<u>1939-59</u>	<u>1951-59</u>
	(percent)	
Changes in net farm income	+150	-28
Change in farm real estate values	+244	+41

The USDA reports a 3 percent rise in land values from March, 1959, to March, 1960, compared with an almost 8 percent rise during the same period a year earlier. For some years to come, we may look back to the March, 1960, index as the all-time high for farm land values in the United States.

Reports from different sections of the nation indicate that land values are leveling off in many areas. The demand among farmers to enlarge farm units will continue strong. However, farm land is selling more slowly. There has been a noticeable shift from a "sellers" market to a "buyers" market. However, land values will not decline sharply unless the number of farms for sale increases substantially. The 1960 levels of farm income, taxes, and interest costs will not support land values except for enlargement purposes.

If the above prediction does materialize, important credit implications are involved. Repayment of loans must then come from net earning capacity. Adequate repayment capacity can hardly be provided by rising asset values and a corresponding increase in credit base, the situation which has prevailed for more than 20 years.

### RETURN TO SOUND CREDIT PRINCIPLES

In the 1940's and 1960's credit was the farmer's cheapest production tool in many respects. This period was an "empire builder" for

those with sufficient initiative to use large amounts relative to total assets in their business. Now a period when asset values on farm property may remain relatively stable at best, or may deflate somewhat, is anticipated. In addition, the United States economy generally has used the loan reserves accumulated in the 1940's and early 1950's. The postwar credit expansion has about run its course, and agriculture must compete with other sectors of the economy for the existing credit base plus the growth in this base from year to year.

In broad terms a farm operator is thought of as having a zero equity in his operation as a hired man. He has no risk except the loss of his job. On the other hand, a farmer having a 100 percent equity in his business (and little or no credit base) is a subsistence farmer. The higher and more stable the earning capacity of the farm business, (1) the higher the credit base relative to the total asset structure, and (2) the greater the possible division of ownership, management, and operation in the business. In addition, the permanent and indestructible qualities of land have always been given special credit consideration.

The 1960 period is one of indecision on agricultural credit. Some lenders may soon become loss-conscious and overcurtail amounts of loans. Farm suppliers generally remain sales-conscious and find the needed credit to finance their sales. As soon as losses to suppliers begin to increase materially, they will likewise be more concerned about sound credit principles. There is no credit panacea for the farm income problem. There is no magic new credit device to (a) solve income problems of individual farmers, or (b) solve the income problem of agriculture. Careful financial planning can (1) raise income on farms needing capital that currently have good balance between owned and borrowed capital, and (2) quickly cut back credit lines on farms that are overextended relative to earnings and assets.

Commercial lenders generally have been faced with declining lendable reserves. Interest rates are at near record levels, considering the years since 1935. Loan committees face the distressing job of continually reappraising their loan portfolios. What industries and which individual farms should be given priority? Who falls out of the credit portfolio? Lenders have again assumed the difficult and responsible task of allocating future business expansion within their sphere of operation. Agriculture and the individual farmer have a large stake in this process. Fortunately, the industry enters this era with its financial organization in good order.

## EFFECTS OF TECHNOLOGY ON EARNING CAPACITY

The widespread application of new technologies and improved management to the commercial farm have tended to expand the size and scale of efficient operation very rapidly during the few decades before 1960 (cf. Chapters 6 and 7). The net result has been larger capital requirements per man and per farm along with greater division of labor,



management, and ownership functions in the commercial farming operation. Commercial agriculture is beginning to show a greater tendency to produce for a market rather than just to produce goods. Integration of the agri-business structure in commercial agriculture is leading to increasingly complex financial problems. As this whole process moves forward, the objective in commercial farming may soon become control rather than ownership of resources in agriculture. Certainly, financial management increasingly is the key to success or failure of the individual firm in commercial agriculture.

The net effect of the rapidly changing size and scale of the commercial farming operation has been to increase the difference in earning capacity of individual farms and operators in the commercial farming classification.<sup>1</sup> As a more concrete example of this widening range in earning capacity, consider this simple illustration:

Net Income for a Given "Bundle" of Labor, Capital,  
and Management on Commercial Farms

	<u>Upper one-third</u>	<u>Middle one-third</u>	<u>Lower one-third</u>
1940	\$3.00	\$2.00	\$1.00
1959	4.00	2.00	.50

The author here is speculating that the real net income to the "bundle" of resources has increased materially for the upper one-third of the commercial farms since 1940; that it has changed little or none for the middle one-third; and that net earnings in real terms to those in the lower one-third has probably decreased. The difference in earning capacity has widened materially between the upper and lower third of commercial farms, in fact, even between the upper and middle third, during a very short span of years. Along with this, we also recognize that the typical bundle of labor, capital, and management resources has shifted toward more management and capital and much less labor. The author estimates that the ratio changed from 3-2-1 to 8-4-1 during this period. It is not argued that the magnitude of the change in ratio is anywhere near correct, but that the direction of the change is correct. If this assumption is valid, important financial implications follow from the rapidly changing nature of the economic unit called the commercial farm.

The differential between the commercial and noncommercial farming sectors is even more striking. Thinking in terms of the part-time, residential, and low-income subsistence units in the noncommercial farm sector, a monetary comparison would be rather difficult to make. On the one hand, the bulk of the income of the commercial farm is from farming. On the other hand, a larger percentage of the income of the noncommercial sector comes from nonfarm sources. However, the

<sup>1</sup> H. G. Diesslin, "Effect of urban and industrial development on agricultural finance," *Jour. Farm Econ.*, Vol. 40, No. 5, Dec., 1958.

differential between the commercial and noncommercial sectors was still not so distinct in the 1930's and early 1940's. The author doubts seriously whether this was true in 1960. Basically, the noncommercial sector of agriculture has been an owner-operator type of unit with a limited amount of credit available to it. What credit was available came primarily from individuals and local lending institutions, and the amount was based more on the balance sheet and moral characteristics of the borrower than on the earning capacity of the farm resources. Here, too, is another example to illustrate the widening differential of farm earnings between the commercial and noncommercial sector:

Net Returns to a Given "Bundle" of Labor, Capital,  
and Management in Agriculture

	<u>Commercial farms</u>	<u>Noncommercial farms</u>
1940	\$2.00	\$1.00
1959	2.50	.25

In terms of real net returns to a given "bundle" of resources, the author speculates that the ratio between noncommercial and commercial agriculture went from 1-2 in the pre-World War II period to 1-9 in 1960. In addition, it is taken into account the fact that the volume of gross production per farm in the noncommercial sector traditionally has been extremely small as compared with the commercial segment.

If the part-time farmer is going to be credit worthy from the farm or the nonfarm standpoint, one must look at the pattern of urban and industrial development to determine where opportunities exist. Areas of rapid urban and industrial development no doubt offer some credit potential. However, the financing problem of the part-time farmer, including the credit problem, is becoming more and more a problem to be answered in terms of the amount and variability of nonfarm income and the resale value of the property in question.

Little time needs to be spent with the question of the residential farmer. Here the financing problem and the credit base at the outset rests on the individual's financial situation and earning capacity in non-farm employment.

In reviewing the financial implications of the above situation, some of the conclusions drawn are as follows:

1. The earning capacity of the farm in question becomes the significant factor in determining the debt-carrying capacity of any given farm.
2. The debt-carrying capacity (from the standpoint of total asset structure) of the upper one-third of our commercial farms has increased materially since 1940, while the reverse situation holds for the lower one-third of our commercial farms.
3. With each passing year, the finance problem in the noncommercial farm sector becomes more and more a problem of financing a non-farm rather than a farm enterprise.

## APPRAISAL OF CURRENT AGRICULTURAL CREDIT PRACTICES

Credit practices in American agriculture have changed materially since the early part of the twentieth century.<sup>2</sup> The credit base of the industry has strengthened substantially as farming has moved to a commercial business structure. In addition, the capital and credit requirements per farm and per working man have pyramided during this short span of half a century.

One of the more prominent features of the earlier period yet remains, i.e., specialized lending institutions which finance only a part of the farming operation provide the major share of the credit to agriculture. Thus, in appraising credit practices, account must be taken of the conventional kinds of credit used—short-, intermediate-, and long-term loans—since any analysis made is more easily understood on this basis.

Short-term credit includes that used for operating expenses. In terms of the type of property being financed, short-term credit is generally associated with nonreal estate items.

Intermediate-term credit includes that used for purchase of assets that have a productive life in excess of one year, such as machinery, breeding stock, land improvement, building improvements, and the like.

Long-term credit is generally associated with farm real estate. Intermediate-term credit, therefore, overlaps into both the short- and long-term areas.

## Short-Term Operating Credit

What progress has been made with the two perennial problems associated with operating loans—terms that are too short and collateral requirements that are too high? Lenders have expanded the use of budgeted loans which match repayments with estimated income dates and which base note terms more nearly on income capacity.

Collateral security has by no means been relegated to a minor role. In fact, chattel mortgages are more commonly used even for farm operating needs. The stigma attached to a chattel mortgage was largely removed during the 1950's. Lenders are using the chattel mortgage much more frequently. This instrument helps to insure that one lender will handle all the borrower's operating credit needs. Where this is the purpose, lenders are doing both the borrower and themselves a service as long as they meet the farmer's needs for optimum farm operations.

Alert lenders are fitting their short-term loans to the productive needs of the farmer. They gear the loan to proper fertilizer use, balanced feed rations, better seed, and the like. Such loans are repaid from gross income of the farm, whereas real estate loans must be repaid from net farm earnings.

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<sup>2</sup> H. G. Diesslin, "A re-examination of the credit needs of agriculture," Jour. Farm Econ., Vol. 36, No. 5, Dec., 1954.



A large volume continues to be handled by farm suppliers. Farmers can reduce costs materially on many items with cash purchases. Short-term credit from credit agencies remains an important tool to aid the farmer in reducing costs and increasing income. This is the type of credit many lenders are best adapted to service. A larger volume is available to lenders in most agricultural areas.

Despite the continued increase in cash operating costs relative to total farm income during the past several decades, there are probably fewer inherent problems in this credit area than either the intermediate- or long-term areas. Although inadequate note terms and high collateral ratios are still common problems in some areas, much progress has been made. Continued effort to overcome inadequate note terms and high collateral ratios will serve to strengthen the loan portfolios of lenders and to give farmers a firmer economic base on which to plan their farm operations. (Also, see related discussions in Chapters 15-18.)

### Intermediate-Term Credit

Credit in this area can be more effective in increasing the productivity of agriculture than in any other area. Yet this continues to be the weakest link in the agricultural market. Engberg arrives at a similar conclusion in Chapter 15. Problems requiring study include the amount and continuity of the investment program needed to yield results as well as the nature and terms of the credit program needed. Since the success of intermediate credit programs depends more heavily upon increases in productivity than do other types of credit programs, lenders generally have been slow to adapt their loan programs to meet the situation.

Capital assets for which intermediate-type credit is required may be divided into two major categories.<sup>3</sup> First, certain items are needed even to farm on a commercial scale. These would include the farmer's machinery, his breeding stock, and other similar items. These capital assets have become a substantial portion of the total assets on commercial farms.

The second major category of capital assets includes those needed for improvement, adjustment, or expansion programs. These improvements may be of either a real or nonreal estate nature and have a productive life in excess of one year. The purpose of these improvement, adjustment, or expansion programs is to increase the earning capacity of the farm and the income of the farm operators.

Such programs generally follow a sequence which must be completed in order to yield expected increases in net returns. For example, in

<sup>3</sup> J. H. Atkinson, Financing Adjustments in the Southern Piedmont, Farm Credit Administration Bul. CR-7, July, 1955; L. E. Kreider, Farmers' Needs for Intermediate-Term Credit, Farm Credit Administration Bul. CR-6, Oct., 1954.

shifting from a cash crop to a cash crop-dairy program, a farmer must establish a pasture and make ready the dairy barns and other equipment before the cows can be purchased and the milk sold. In other cases, the improvement program may merely be a matter of doubling or tripling the present size of an enterprise in order to increase efficiency of production.

The total capital involved in such an improvement program may be substantial. Studies of such improvement programs on individual farms over a period of years indicate that they may, in many cases, equal the original investment in real and nonreal estate assets.

With respect to this latter type of intermediate credit need, the lender must be skillful and experienced in order to assess the probable results properly.

First, he must be able to estimate the increase in the earning capacity of the farm operating unit after the capital investment program is completed. Second, he must be able to judge the time span necessary in order to complete the improvement program and determine when the increased earnings will be forthcoming. Third, the lender should be able to judge the change in fair market or sale value of the property in the community which will result from the completed improvement. This is particularly important in the case of real estate improvement—new buildings, tile, fence, soil improvement, and the like. The lender should be able to reappraise the farm in view of these improvements and increase the loan limit on the property accordingly. Proper precautions can be taken to see that the money loaned is used for the improvements designated.

The essential factor in the success of this type of lending program is correlating payment programs with repayment capacity. Murray and Engberg present similar arguments in Chapters 11 and 15, i.e., most programs must be carefully budgeted in order to estimate the income dates and amounts. Income must be balanced against a continuation of investment expenditures that follow a logical sequence. Much support has been given to the idea that a five-year investment program should be covered by a five-year note, a seven-year program by a seven-year note, and the like. On the contrary, the term of the note need not coincide with the length of the program. Where the repayment capacity on a sound loan is five years, a five-year repayment program is essential, but the term of the note in this situation may vary from one to five years, depending on several circumstances. The actual term of the note written on intermediate-term credit should depend on the risk of the loan in question. The term of the note can be used by the lender to reduce the risk of the loan, or at least to retain better control of the situation.

First, assume that we have a marginal borrower. He currently has borrowed about all that is safe on his real estate and nonreal estate assets in his particular situation. However, careful budgeting indicates that an investment equal to 15 percent of his present total assets over the next four years would increase the net earning capacity of his farm

about 50 percent. Such a loan would be a sound investment for the lender, since it increases the repayment capacity on the money already loaned as well as on the intermediate credit necessary to improve the farm. However, this is a situation of maximum risk to the lender. In order to retain control of the situation, the lender should logically use an annual note in order to keep repayment "pressure" on the borrower. If trouble develops, the lender is in a position to act quickly in this situation.

A second situation might involve an individual with a safe debt load who is currently adjusting his farming operation to include a major livestock enterprise. In this situation, the managerial ability of the operator with respect to this new enterprise is unknown. Such an investment would require a repayment program of several years. If the lender is concerned about the risk, an annual note is in order. However, the borrower in this situation is entitled to a written agreement stating the conditions of the renewal from year to year.

The third category would include the individual who has sufficient equity, proven managerial ability, and well-formulated operation plans. There is every reason to give him a note of the same duration as the repayment program set up for the loan—whether it is a three-year or a five-year repayment program.

The term of note is restricted by state statutes and supervisory directives in some instances. For example, some commercial banks are restricted to loans not exceeding one year unless secured by a title retention note (conditional sales contract or purchase money contract). There are no federal laws or regulations limiting the note term, and there is no opposition from the Federal Reserve Board. A letter by the Board of Governors (S-1579) was valuable in that it helped to clear up this important credit policy area for banks.

Often farmers, particularly those who already have some credit base, find it extremely difficult to retain much flexibility in their program if a commitment is made on a note with terms longer than one year. Farm operators seldom make detailed plans over a five- to seven-year period, even though a major improvement program may require such a time span. And timing of the improvement program by the farm operator will vary materially with year-to-year changes in prices, yields, and other expectations.

An annual appraisal of the year's results, which allows checking the progress and adjusting future plans, is a strong advantage of the annual renewable loan to both lender and borrower. Most farmers have in mind a long-term operating objective, and they plan year by year toward that objective. This objective is subject to constant revision as a result of economic and production uncertainty. Where a substantial amount of the investment loan is renewed from year to year, however, a written agreement stating the condition of the renewal is highly desirable. This practice is not currently followed.

Commercial lenders must adapt their lending policies to the increased intermediate credit needs if they expect to serve agriculture.



Based on economic considerations, added working capital such as more machinery, livestock, buildings, tile, fences, and the like, create new wealth in agriculture just as new homes do in the general economy.

### Long-Term Loans

Under present mortgage lending practices, considerably less than 50 percent of the current market price of a farm can be borrowed on the average. Loans as high as 50 percent of the market price on the average, and better quality real estate, are becoming less uncommon. However, less than 50 percent is the practical maximum on most of the commercial land in farms in the United States.

Mortgage loans are such a small percentage of the current market price that any loss to the lender is hardly conceivable. Delinquency and foreclosure have been practically nonexistent since the beginning of World War II. Even during the 1950's, delinquency did not increase a great deal. It is true that this conservative lending policy retarded the rise in farm land value during and following World War II. At the same time it has made the purchase of farm real estate more difficult for potential farm owners.

Compared with its earning capacity, the market price of average and below-average farm land is generally well above that of good land. Therefore, large loans relative to selling price on these properties tend to magnify the problem on land that is already overpriced. The perennial problem in farm mortgage lending continues to be the lack of sufficient differentiation between good and poor land, even though this condition has been substantially improved. If any risk exists at all on farm mortgage loans outstanding, is it not on the below-average farms on which relatively large farm mortgage loans may have been placed?

The mortgage lending situation is now almost the reverse of the situation during World War I. First and second mortgages for a high percentage of the sale price, written on short-term, unamortized notes, were common around this war period. As of 1960, there were conservative lending ratios and partially or completely amortized loans for terms of 15 to 35 years. The lending policy is fairly adequate and possibly economically sound during periods of rapidly rising land values and high farm incomes such as were experienced during the 1940's.

However, during periods of lower farm income and relatively stable land values, such as may be experienced in the 1960's, conservative lending ratios could be a formidable barrier to the transfer of farms from one individual to another. Such situations bring strong pressure for lower equity farm mortgage loans at a time when repayment capacity is much reduced.

After re-examining the many farm mortgage experience studies available and comparing lending practices in agriculture with lending practices in other industries, one must point up the real danger of rising land values from a low-equity loan program and to almost assured

foreclosures and ensuing losses in periods of agriculture recession. In addition, farms in better land classes are capable of carrying higher debts relative to fair market price than those in poorer land classes. Only higher debt to value ratios on good relative to poor land can tend to equalize foreclosure and loss rates on different types of land and assist the potential buyer in recognizing and better pricing land of different classes.

If commercial farm mortgage lenders are interested in forestalling further competition in the farm mortgage market, is it not logical to assume that they will have to reappraise their loan to value ratios and, in so doing, become increasingly careful of amounts loaned on property of different grades within geographic areas? This author agrees with Tootell's statement in Chapter 17 that further experimentation with the open-end mortgage is needed, and a careful examination of the merits of partial versus full amortization is desirable.

### FINANCING MODERN COMMERCIAL AGRICULTURE

Historically, agriculture has been notorious for its fragmentary financing pattern. Until relatively recently, much of the financing has been done on a commodity basis. Even in 1960 it was not uncommon for lending institutions to approach the farmer's credit needs from the standpoint of financing feeder cattle, dairy, cotton, farm machinery, broilers, or tung nuts. The nature of agricultural operations is such that the commodity financing approach is not adequate. Likewise, piecemeal financing, enterprise by enterprise, is not a sound credit arrangement.

The merchant is still an important source of credit, but commercial lenders have materially reduced the proportion merchants have to carry. For example, the farm machinery industry has made a notable shift from manufacturer and dealer financing to commercial lender financing since 1940. Although manufacturers carried farmers' notes equal to nearly one-half of their equipment sales throughout the 1930's, practically all of this was shifted to commercial lenders in the 1940's. In 1960 manufacturers financed more of their sales once again as a matter of sales policy.

The bulk of the country's commercial broiler industry is being financed by the feed manufacturers and dealers (cf. Chapter 8). This industry is in about the same position the farm machinery industry was in the 1930's.<sup>4</sup> Since the broiler industry is a relatively new, highly specialized operation, the conventional lending institutions have hesitated to play a more direct part in its development. However, with few exceptions, commercial lenders have had experience with this type of production and would be able to supply much of the specialized credit

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<sup>4</sup> H. G. Diesslin, *Agricultural Equipment Financing*, Nat. Bur. Econ. Res., Occasional Paper No. 50, 1955.

needed. Sales policy of suppliers would need to change substantially before the industry could become attractive to the banker at producer level, however.

The historical commodity financing approach has given rise to specialized lending institutions which can finance part, but not all, of the farmer's operation. These institutions were developed in a time of critical need and were justified. However, with increasing size and commercialization of agriculture, we have reached the point where a lending institution must be in a position to finance or to arrange financing of the entire farming operation rather than just a portion of it.

Specialized lending institutions which can finance only part of the farming operation are at a competitive disadvantage in the agricultural lending picture. There are many disadvantages to financing a farm operation through several institutions, and this situation generally results in more limited availability of credit than the farm operation warrants.

### Developing a Balanced Credit Program

More emphasis is needed on a balanced credit program for the individual farm. Hopkin offers related comments in Chapter 16. There is a real need for package credit to cover the entire farming operation. It can be provided best in financing the farm as a single unit of operation, and not by breaking it down into short-, intermediate-, and long-term segments.

In financing the farming operation, for example, long-term credit should be used under the following conditions: (1) when credit is needed continuously over a period of years; and (2) when there is a possibility that changing economic (or other) conditions will extend the length of time the credit is needed. It is not important whether this credit is used for a long-term investment or for a series of short-term investments. The important consideration is that credit will be needed over a long period of time.

Even in the case of substantial improvement programs, which are generally classified under intermediate-term credit, certain rules can be followed. As much long-term credit as possible should be used to finance such programs with the following limitations: (1) the amount probably should not exceed the average amount of credit needed over the first several years of the improvement program; (2) amortization should be extended over a fairly long period—maybe as long as 10 to 20 years in some cases—so that repayments will be low; (3) provision should be made for a flexible repayment program—advance or deferred annual payments and a complete repayment option after a few years without penalty. Short-term credit should be used to take care of all seasonal fluctuations in credit needs and to provide, for the improvement program, additional credit which cannot be provided through the use of a real estate mortgage.

This suggests that some method needs to be devised for making



available to the farm landowner an open line of credit, using his real estate as collateral security. Expanded use of open-end mortgages on farm real estate would more nearly give the farm operator the open-line of credit needed to finance the whole farming operation. The open-end mortgage materially reduces the cost of new loans because a new appraisal, title search, and the like are unnecessary. More and more, commercial lending agencies are experimenting with this type of mortgage loan where state laws permit their use.

### Reappraising Partial Amortization

Since World War I agriculture has experienced a shift from short-term nonamortized farm real estate loans to long-term, fully amortized farm real estate loans. Certainly this procedure is much sounder than earlier policies. Some lending institutions write fully amortized loans almost exclusively. Has the American farmer been oversold on fully amortized real estate loans?

Is there not a need and justification for perpetual indebtedness on some of our farms? Certainly it would be unwise to recommend permanent indebtedness on a high percentage of the farms in this country. But is there any reason why the farm mortgage debt should ever be totally repaid on a high-quality 200-acre commercial Corn Belt farm at a 1960 worth of \$450 an acre? Is there any reason to reduce the indebtedness below one-fourth or one-third of the current market value? If the owner borrowed \$200 per acre on this farm initially, is there any reason why more than \$100 per acre should be included in the amortization schedule?

For example, if this is a twenty-year mortgage, the \$200 loan per acre could be amortized at the rate of 3 to 5 percent per year until reduced to \$100 per acre. At that point, only interest payments on the outstanding balance would be required with optional principal payments.

From a personal standpoint, an individual farmer may want to pay off the loan, but from a strictly business standpoint, perpetual indebtedness would be justified and profitable except possibly in a period of deep depression such as was experienced in the early 1930's. The lender has a riskless loan that yields higher returns than many other alternatives, and the permanent investment reduces administrative costs on the loan portfolio. The borrower can generally earn more than the interest cost of the loan, and the earnings that would have been used to amortize the loan can be used to maintain or to improve production efficiency.

### Risk Capital—Other Considerations

With the rapid technological progress in agriculture, aggressive agricultural lenders may well use a small percentage of their loan

portfolio to encourage the adoption of this new technology. In addition, this risk capital can be used to assist young farmers who cannot qualify under normal equity requirements, but who have managerial capacity and a farm available. Such new technologies would include supplemental irrigation, less expensive and more flexible farm buildings, expanded application of nitrogen fertilizers, and the like.

Many such loans can be adequately protected through insurance. The use of credit insurance is becoming increasingly common and is certainly helpful in reducing the risk or loss on a loan—particularly with respect to young operators getting started.

In addition to credit insurance, life insurance, crop insurance, and other similar devices, price-support programs have also reduced the over-all credit risk in agricultural lending. These programs, plus the continued application of new technologies which make possible greater output and increased earnings per man, have all tended to reduce loan risk on the average and above-average commercial operations. At the same time, they have widened the gap between the below- and above-average operators. As a result of this situation, the personal characteristics and managerial ability of the operator play a much greater role in determining the credit risk of the individual farm operator.

### Role of Credit Institutions

American agriculture is serviced by a comprehensive set of credit institutions. In addition, individuals play a dominant role in financing the farm real estate market. Individuals selling farm property always have the first opportunity to finance the sale. This becomes the major means of investment for retiring farm owners. Therefore, they have always been large holders of farm mortgage indebtedness. In addition, the rapid increase in use of the land contract sale to minimize income taxes tends to keep much of the long-term debt in the hands of individuals. Insurance companies and insured banks have increased their relative holdings of the mortgage debt at the expense of the Federal Land Banks since 1940 (Table 13.2). The land banks have increased their holdings to some extent since 1950.

Commercial banks continue to hold over two-thirds of the nonreal estate credit among institutional lenders. PCA's have nearly doubled their relative holdings since 1940, while the Farmers Home Administration's holdings have materially decreased. No reliable estimates of individual holdings of this type of indebtedness are available.

The nature of credit institutions is such that they finance only part of the farming operations—real estate or nonreal estate assets. Commercial banks can finance the entire farming operation, although their assets are not particularly well adapted to farm real estate mortgage loans. As a result of the increasing financial complexity of the farming operation, it becomes increasingly imperative that long-term and short-term lenders coordinate their lending programs to individual

Table 13.2. Distribution of Debt Outstanding by Lenders, January 1, 1940, 1950, and 1960

	1940	1950	1960 <sup>a</sup>
	Mortgage debt (percent)		
Federal Land Banks	30.5	16.3	19.0
Insurance companies	15.0	21.0	23.0
Insured banks	8.1	16.8	13.2
Individuals and miscellaneous	46.4	45.9	44.8
	Nonreal estate (percent)		
Commercial banks	69.5	75.8	73.3
PCA's	11.8	14.3	20.7
FHA	18.7	9.9	6.0

Source: Data supplied by Agricultural Finance Research Branch, FERD, ARS, USDA.

<sup>a</sup> Preliminary.

farmers—e.g., commercial banks, insurance companies, PCA's, and FLB's. The competitive element in agricultural lending is such, especially in commercial sectors of the industry, that agriculture's financial needs currently are serviced as efficiently as other sectors of the economy. Any concerted effort to provide additional subsidized credit (either low equity financing or interest rates below market levels) would encourage existing private lending institutions to leave the farm financial market.

Even under existing competitive conditions in the farm credit market, some private lenders are re-evaluating their agricultural holdings. For example, how long will insurance companies aggressively compete for a limited number of farm real estate mortgages in the commercial farming areas as they have done since 1940? As the economy continues to grow, a smaller and smaller portion of their investment portfolio is in the agricultural sector. A specialized staff is necessary to solicit and to appraise the potential investment. Farm loans are small relative to some other types of investment. The cost of obtaining the investment is high relative to other investments, particularly where a specialized staff making farm loans only is maintained. Farms are not concentrated like urban homes. In addition, the life insurance company can finance only the farm real estate, not the entire farming operation. This latter situation is not unique to insurance companies, of course; it is equally true of the Federal Land Banks. Even so, it will not be too surprising if as many as one-half of the 15 or 20 major insurance companies making farm mortgage loans gradually drop out of the market during the 1960's or 1970's. It would be a serious financial blow to American agriculture, however, if all major insurance companies pulled out of the farm mortgage market. They are an extremely important competitive element in the farm market as well as a large supplier of the total credit needs.



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## *Adequacy of Capital and Credit for Chronically Low-Income Farms*

**C**APITAL IS ALWAYS SCARCE. From an economic viewpoint, therefore, the term "adequacy of capital" can mean only the quantity consistent with income maximization. Many believe that not only the quantity of capital used, but also the quantity available to low-income farmers falls short of such an optimum. This chapter is concerned with examining this belief to indicate to what extent and under what conditions it is true. More specifically, the following questions are examined: (1) How much capital do the nation's low-income farm operators now use? (2) How much capital do they need in order to maximize their incomes? (3) If they need more capital than they are now using, how much of this additional capital can they obtain and from what sources? (4) If these "needs" cannot be obtained wholly from existing credit sources, why not? (5) When the answer to question 4 is known, can it still be demonstrated that low-income farmers are using less capital than is consistent with optimal interfarm and interindustry allocation of capital resources? Specifically, are there real economically justifiable needs for more capital in low-income agriculture?

In examining these questions, consideration will be given only to those farm-operator families with net money incomes of less than \$2,000 from all sources. Such arbitrary delineation of low-income farm families is subject to important weaknesses on both economic and welfare grounds. However, it permits use of some statistical information not available for low-income farm families delineated on a more meaningful economic or welfare basis.

Based on the 1950 census, this definition would have embraced, in 1949, 68.3 percent of all farm-operator families in the South and 52.9 percent of all those in the United States (cf. Chapter 1). In many areas of the South it would have included more than four-fifths of all farm operators. The percentage of farm families with net cash incomes under \$2,000 declined between 1949 and 1958 to about 36 percent in the United States although, relative to the earnings of nonfarm people, the farm income situation worsened during this period.

## LOW-INCOME FARMERS USE VERY LITTLE CAPITAL

Available information indicates that most of the nation's low-income farmers use relatively small quantities of land and related capital resources. This has long been indicated by statistics on the average size of farms and amounts of other farm resources in the nation's major low-income areas. According to the 1954 Census of Agriculture, total land per farm in the South was 167 acres compared with 213 acres per farm in the North and 242 acres per farm in the nation. The South had only 45 acres of cropland harvested per farm compared with 113 acres in the North and 116 acres in the West. The value of land and buildings per farm in 1954 was \$12,755 in the South, \$23,506 in the North, and \$47,334 in the West. Almost a third of all farms in the South had fewer than 30 acres of total land per farm, and 47 percent had fewer than 50 acres. About half of the South's farms had fewer than 20 acres of cropland harvested.

Within major low-income areas, the amounts of resources commanded by low-income farm families are substantially below the average for all farm families. For example, in the 24-county area comprising State Economic Area 12 in northeast Texas, all farm families had total farm resources worth \$14,762 per family. Those with incomes under \$2,000, however, had farm resources valued at \$9,334 per farm. All full-time farmers in this area had total farm resources valued at \$21,451 per farm. However, those with family incomes of less than \$2,000 had slightly less than \$13,000 worth of farm resources.<sup>1</sup>

In low-income rural areas, these types of situations and problems are not unique characteristics of farm families alone. They are equally as important for nonfarm rural families. For example, in Rural Development "pilot" counties of Alabama in 1957, 50 percent of the farm families had family incomes of less than \$2,000, whereas 47 percent of the nonfarm rural families in these same counties also had family incomes of less than \$2,000. In all characteristics measured, these two groups of rural families were quite similar.<sup>2</sup>

In general, the nation's average low-income farm family is probably using less than half as much farm resources as do farm families who normally have incomes of \$2,000 to \$3,000 per year.)

## LOW-INCOME FARMERS ARE LIMITED IN THEIR OPPORTUNITIES TO USE MUCH ADDITIONAL CAPITAL

It does not follow from this disparity between the value of resources used by low-income families and those commanded by farm families in

<sup>1</sup> J. H. Southern and W. E. Hendrix, *Incomes of Rural Families in Northeast Texas*, Tex. Agr. Exp. Sta. Bul. 940, College Station, 1959.

<sup>2</sup> Ben T. Lanham, Jr., *Opportunities for Rural Development in Fayette County, Alabama*, and Edward E. Kern, *Opportunities for Rural Development in Chilton County, Alabama*, (Mimeo.), Ala. Agr. Exp. Sta., Auburn, 1958.

a more favorable income situation that the nation's low-income farm families need—that is, can profitably use—additional capital resources. Rather, the extent to which they can profitably use additional resources can vary greatly depending upon their labor and management resources (cf. Chapters 21 and 23). Because of their limited labor and management capacities, many low-income families may already command as large a quantity of farm resources as they can employ productively. Indeed, some whose labor capacities have declined because of advancing age or illness may be holding more farm resources than are consistent with the maximization of their incomes. Even among low-income families with no serious labor or management limitations, many may be operating near their optimal level because of the kind of general economic environment within which they are farming.

### Many Low-Income Farmers are Limited in Their Labor Capacities

Information provided in the 1950 census indicates that many of the nation's low-income farmers are handicapped in their employment alternatives because of their age, education, and other characteristics bearing upon their employability. In the United States the median age of farm operators with family incomes of less than \$1,000 in 1949 was 51.9 years compared with a median of 47.6 years for all farm operators. Almost two-thirds of the operators with family incomes under \$1,000 had not completed elementary school compared with 42 percent for all farm operators.

More complete information on the personal characteristics of farm families by income levels is being developed in studies by the Farm Economics Research Division, ARS, USDA, in cooperation with state agricultural experiment stations in selected low-income areas of Texas, Louisiana, Mississippi, Tennessee, Florida, Georgia, Kentucky, Missouri, Michigan, and other states. In these study areas, large percentages of the low-income farm operators have occupational handicaps of kinds that severely restrict their adjustment opportunities within either farm or nonfarm work. Mackie directs his attention to public investments in human resources in Chapter 22.

For example, in the 24 counties comprising State Economic Area 12 in northeast Texas, only about one in 10 farm operator families with net money incomes in 1955 of less than \$2,000 had an able-bodied male family head under 45 years of age who had completed five or more grades in school. Martin presents related data on education and educational expenditures in Chapter 4. More than a third of the farm families with incomes under \$2,000 had male family heads who were 65 years of age or older. Another third of these farm-operator families had male family heads under 65 years of age, each of whom reported a major physical disability that limited the kind or amount of work he was able to do. Only 5 and 18 percent had able-bodied male family heads aged 55 to 64 years and 45 to 54 years of age, respectively.<sup>3</sup>

<sup>3</sup> Southern and Hendrix, *op. cit.*



In Alabama's rural development "pilot" counties, the average age of male family heads for farm families was 53 and for nonfarm families 48 in 1957. Only 3 percent of farm family heads were under 35 years of age compared with 23 percent of nonfarm family heads in this age group. The average educational level attained by male family heads was 7.2 years for farm families and 7.8 years for nonfarm families. Only 2 percent of farm family heads had more than 12 years of education compared with 8 percent for nonfarm families. Nearly 60 percent of the male family heads of farm families reported fair or poor health compared with about 46 percent for nonfarm families.<sup>4</sup>

These findings, which are fairly typical of those in most of the low-income areas that have been studied, reveal that most low-income farm families are headed by persons who, regardless of their capital position, are very limited in their adjustment potentials in either farm or nonfarm sectors of the economy. It is the lack of labor and management abilities rather than the lack of available capital which is the crucial limitation to increasing the productivity and income of most of these farm families.

Nonetheless, after accounting for the aged, the disabled, and other seriously handicapped classes, there remain many low-income farm families in most of the nation's major low-income farm areas who are free of these more obvious defects. Available information indicates that for most of these families more land and capital are essential to improving their incomes through intrafarm adjustments.

#### Major Low-Income Areas Will Require Large Structural Changes for Productive Use of Much Additional Capital

The provision of such additional capital, however, while constituting a requirement for correcting the low-income problem through intrafarm adjustments, would not in itself be a sufficient condition to insure such results, except for possibly a small number of carefully selected farmers. This is true because even where the low-income farm problem exists among able-bodied farmers, it is much more than a result of capital limitations. To the extent that it is an economic problem, the low-income problem is rooted in large measure in the general structural and growth characteristics of the general economy in which it occurs. It is a manifestation in most severe form of the excess of labor resources that characterizes American agriculture generally (cf. Chapters 3 and 4). As such, it is also a manifestation of agriculture's large excess capacity (cf. Chapters 6 and 7). This part of agriculture's excess capacity is largely latent, hence, it does not currently result in a large agricultural output of the kinds requiring special storage and other surplus disposal programs. But that a large capacity for such output exists in many of the nation's low-income farm areas is well

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<sup>4</sup> Lanham and Kern, *op. cit.*

documented in numerous studies of production adjustment opportunities made of low-income farms. For example, the results of a study of individual farm adjustment opportunities in the Limestone Valley areas of Alabama show a net management return for a flock of 4,000 cage layers of almost \$9,000 after paying for 2,412 hours of labor at 60 cents per hour.<sup>5</sup> Similar results were found in North Carolina.<sup>6</sup> Given adequate markets to stand up under pressure of substantial increases in the supply of the farm products that farmers can produce and favorable agricultural policy programs, many of the South's farmers could easily double their output of cotton, tobacco, peanuts, and other products by increasing their acreages and by using technically superior and economically feasible production methods.

It does not follow, however, that the placing of large quantities of additional capital in the hands of many of the nation's low-income farmers would appreciably improve their income situation. Rather, in view of the nature of the demand for farm products, the question arises: Would the allocation of much more capital to low-income agriculture increase efficiency of the economy as a whole? Or, would the provision of much more capital to this sector of agriculture need to be defended mainly on equity grounds?

Were it not for the large supply and low value of labor in most low-income farm areas, the capital now employed would yield very low returns. For example, even with very low wage rates in 1949, most productivity regions lying wholly within the South had capital returns on commercial farms of less than 3 percent—using the residual method of calculation.<sup>7</sup> Some researchers have shown a high marginal productivity of capital in low-income areas, e.g., in the Piedmont areas of Alabama and Georgia. But, besides being subject to question as to how well the observations used in such studies have met the requirements of the assumptions underlying the estimating techniques used and how well they have accounted for risk and uncertainty elements, the market assumptions on which these results have been predicated make generalizing from these findings to aggregations of more than a few farms a questionable procedure. In terms of their underlying market assumptions, measurements of the marginal productivity of capital based on Cobb-Douglas equations or other such estimating equations are subject to the same aggregative limitations as Wheeler and others have noted for "optimal" farm organizations developed with a linear programming technique.<sup>8</sup>

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<sup>5</sup> T. H. Ellis, E. J. Partenheimer, and J. G. Goodman, *Costs and Returns from Poultry Production in the Limestone Valley Areas of Alabama* (Mimeo.), Ala. Agr. Exp. Sta., Auburn, 1960.

<sup>6</sup> C. E. Bishop and J. G. Sutherland, *Possibilities for Increasing Production and Incomes on Small Commercial Farms, Southern Piedmont Area, North Carolina*, N. C. Agr. Exp. Sta. Bul. 117, Raleigh, 1955.

<sup>7</sup> E. G. Strand and E. O. Heady, *Productivity of Resources Used on Commercial Farms*, USDA Tech. Bul. No. 1128, Washington, D. C., 1955.

<sup>8</sup> R. G. Wheeler, review of "Possibilities for increasing production and incomes on small commercial farms, Southern Piedmont area, North Carolina," by J. G. Sutherland and C. E. Bishop, *Jour. Farm Econ.*, Vol. 39, 1957, pp. 196-97.

The low-income farm problem could and probably would have been solved long ago were it merely a result of capital limitations. But the capital limitations observed in the nation's low-income farm areas, instead of being main causes of low incomes, are actually the result of other more fundamental conditions that limit both the size of income and the building up of large amounts of capital per farm in these areas. A high ratio of farm people to land (small farms) and severe limitations in effective demand for the kinds of products that they now have the resources to produce—these are among the main factors that limit both (1) adjustment opportunities and (2) current incomes and amounts of capital in major low-income farm areas.

These conditions have probably been important reasons for both the relatively small credit advances made by the Farmers Home Administration to its borrowers in many parts of the South and the relatively small income gains made by its southern borrowers. In a recent study of FHA operating loan borrowers, it was found that borrowers in the South increased their average income while on the program by only 32 percent compared with increases of 69 percent and 63 percent, respectively, for borrowers in the North and West. Yet, when living within equally poor localities as measured by the median income of all farm families, families in the North made no greater progress than did those in the South.<sup>9</sup> These differences among areas support the hypothesis that the low-income farm problem is one that can be solved only in a small part through individual farm adjustments. This would be true even though the amount of capital needed to maximize income was always readily available to every low-income farmer.

### THE PROVISION OF MORE CAPITAL TO LOW-INCOME FARMERS AS EQUITY MEASURES

These general observations about the adequacy of capital for chronic low-income farms hold not only for "low-income" agriculture but for all of American agriculture. Our mounting farm surpluses in the face of production controls and large-scale surplus disposal operations under Public Law 480 hardly indicate the use of too few capital resources in American agriculture.

In shifting attention from the consideration of agriculture as a whole to that of individual farmers, however, it is found that farmers are faced with exceedingly critical capital and credit problems. This is true because of (1) the rapid farm technological advances of kinds that help to increase scale possibilities and (2) the highly competitive character of farming which makes necessary the rapid adoption of such scale-increasing technologies as a condition of survival. Headly

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<sup>9</sup>W. E. Hendrix, *Approaches to Income Improvement in Agriculture: Experiences of Families Receiving Production Loans Under the Farmers Home Administration*, USDA Prod. Res. Rpt. No. 33, Washington, D. C., 1959.



stresses this point in Chapter 7. Material increases in production and income for chronic low-income farmers depend upon providing (1) more productive resources per worker and (2) more opportunities for non-farm work for the young people who grow up in these areas but who are not needed in farm occupations. The solution to these problems is not necessarily in moving marginal farm people into industry, but more likely in providing opportunities for greater flexibility and mobility between farm and nonfarm employment.<sup>10</sup> Farm technological progress, coupled with inelastic demand for farm products and existing impediments to the farm-nonfarm transfer of labor, rapidly increases the capital requirements per farm without increasing farm income. Scofield and Barton develop this point in Chapter 6.

Briefly, this is the kind of capital problem that faces much of American agriculture. Such also are the facts behind the rising ratio of debt to income that has characterized American agriculture. Large increases in the market value of land to which farmers hold title have helped farmers maintain a debt-asset ratio favorable to obtaining in general capital markets a large part of the funds they have needed to keep up in the farm technological race (Chapter 6). Without marked changes in farm credit practices, however, this question arises: How long can farmers continue to obtain in the general capital markets much of the increasing amounts of capital they will need to maintain their present rates of technological progress under the condition of increasing ratio of debt to income?

Chronic low-income farm areas differ from more productive farm areas in that the former have always been subject to conditions that cause low incomes, whereas farmers in the latter areas have at times experienced conditions highly favorable to the expansion of their farming operations. Having never experienced conditions highly favorable to large expansion of their farming operations, the nation's chronic low-income farmers have seldom if ever found themselves in a critical financial situation. Instead, many of them have developed deeply rooted aversions to indebtedness for any purpose—aversions which, in light of past economic expansion opportunities, may have been sound from an economic viewpoint (cf. Chapters 20 and 21).

The fact that the nation's chronic low-income farmers have seldom been in a financial situation so critical as to require new special extra-market credit institutions (such as our federally-sponsored cooperative farm credit program was at the time of its inception and at the time of its reorganization and strengthening to meet the financial crisis of commercial agriculture in the early thirties) is their only economic advantage over farmers in the more productive parts of agriculture. However, this advantage does not justify from an efficiency standpoint any large expansion in special credit facilities for those farmers now in the nation's chronic low-income areas.

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<sup>10</sup>Ben T. Lanham, Jr., "Characteristics of Alabama's future agriculture," *Flight From the Soil: Alabama Agriculture in a Changing Economy*, Ala. Bus. Res. Council, Univ. of Alabama, 1958.

Rather, in view of the large excess capacity of agriculture as a whole, and with the large capacity lying wholly latent in much of the low-income agriculture, the case for the more adequate provision of special credit facilities in low-income farm areas may need to rest largely upon general equity considerations (that is, upon more nearly equalizing incomes within agriculture) rather than upon the grounds of increasing the economic efficiency of agriculture as a whole.<sup>11</sup> Within limits, the more adequate provision of credit to low-income farmers as a means of more nearly equalizing opportunity and incomes within agriculture is possible within the framework of economically sound business credit practices. This position is taken because (1) production innovations, instead of being adopted by all farmers simultaneously, are first adopted by a relatively small number of farmers, and (2) the main economic benefits of farm technological advances accrue to farmers who are earliest in their adoption. Hence, by coupling special financial assistance with special technical assistance to facilitate the early adoption of new and better farm technologies, it is possible for a limited number of carefully selected low-income farmers to make phenomenal improvements in their incomes and net worth. Woodworth and Fanning stress this point in Chapter 23. Examples of such improvements can be found throughout the South among those farmers who have been assisted through the FHA program.<sup>12</sup>

How many of the nation's chronic low-income farmers could be thus assisted cannot be answered precisely. The number, however, would probably represent only a small percentage of all chronic low-income farmers. It is doubtful whether much of this increase could be achieved without increasing the pressure of supply on demand and lowering the income of agriculture as a whole. This is why it is suggested here that, viewed from the standpoint of agriculture as a whole, most of what can be done through intrafarm adjustments to raise the incomes of low-income farmers may need to be defended, if at all, mainly on equity rather than on efficiency grounds.

If the view is accepted that credit policies and programs to raise incomes of chronic low-income farmers through intrafarm adjustments must rest more upon equity than upon efficiency considerations, the question as to how much additional capital chronic low-income farmers need in the aggregate must depend largely upon how far it is desirable to go in correcting the income disparities that exist merely within agriculture. Expressed more accurately, it depends upon how equally divided among farmers should be the extent to which agriculture as an industry bears the cost of inefficient resource use. This raises the problem of interpersonal welfare comparisons, an insoluble problem in economic theory.

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<sup>11</sup> For similar treatment of this general kind of problem, see Tibor Scitovsky, *Welfare and Competition*, George Allen and Unwin, Ltd., London, 1952, Chap. 1.

<sup>12</sup> W. E. Hendrix, *Capital Accumulation by Families on Small Farms in the Piedmont, Ga.* Agr. Exp. Sta. Bul. N.S. 8, 1955; W. E. Hendrix, *Approaches to Income Improvement in Agriculture*, USDA Prod. Res. Rpt. 33, Washington, D. C., 1959.

The provision of capital merely to achieve a more equal personal income distribution obviously poses large difficulties. The very nature of such a problem virtually rules out the general capital market as a source of supply except for the small number of chronic low-income farmers who, by being in the vanguard of technological progress, might compete successfully with other capital users in general capital markets. Hence, chronic low incomes in agriculture cannot be attacked on a large scale as mainly capital and credit problems without heavy reliance upon public grants and subsidies. Capital funds to chronic low-income farmers from grants and subsidies have always been scarce, also. There is little reason to suppose that they will be any more plentiful in the near future. Furthermore, such capital transfers, even if they were socially acceptable, would probably be one of the most costly ways, in terms of effects on general efficiency and welfare, of achieving a more equal distribution of income. Alternative approaches to this problem are presented in Chapters 22 and 23.

### NEED FOR BALANCING LABOR WITH OTHER RESOURCES

The low-income problem results primarily from imperfection in the functioning of labor markets rather than imperfections in the functioning of capital markets. The labor market imperfections most relevant to the low-income problem consist mainly of wage policies in nonfarm labor markets which, except in periods of very rapid economic growth, permit the supply of labor to greatly exceed the demand. The effects of these imperfections in reducing employment are aggravated by price policies in other factor and product markets.

Agriculture as a whole, and especially that in chronic low-income areas, is highly vulnerable to the incidence of the underemployment resulting from such wage and price policies because (1) of its competitive characteristics with respect to the freedom and ease of entry of workers and its flexibility of labor earnings; (2) underemployment permits selectivity in the hiring of workers and correlatively in the distribution of underemployment that militates more against underemployed farmworkers because of their age, education, and other characteristics than against their chief competitors for nonfarm jobs; and (3) high farm birthrates, declining needs for labor as a result of farm technological progress, and the relatively inelastic demand for farm products make it necessary for agriculture to export a large number of workers annually to even maintain its relative income position; hence, agriculture's vulnerability to the incidence of the economy's underemployment is increased.

Given market structures that permit the backing up and accumulation of large excesses of labor in agriculture, solution of the chronic low-income problem as a resource allocation problem must be found mainly in increasing the rate of general economic growth, and thereby, the nonfarm demand for labor. Growth of the nonfarm economy's



demand for labor at a rate sufficient to absorb the economy's existing underemployment in both farm and nonfarm sectors, in the face of a continuing rapid population growth and rapid technological progress, is a most basic requirement for correcting chronic low incomes in agriculture as an economic problem (cf. Chapters 1 and 7).

The drawing off of excess labor from chronic low-income farms can be expected in many instances to open up farm expansion opportunities for the remaining low-income farmers, for which additional capital will be needed. There may be a need at the outset for special credit facilities, such as those provided by the FHA, to spark the adjustments required as such expansion opportunities are opened. As the emerging adjustment opportunities are more widely recognized, however, provision of the additional capital needed will not likely constitute a major obstacle to their realization. In recent years, credit agencies have demonstrated a large capacity and willingness to serve the credit needs of agriculture, even in low-income areas, where doing so has been consistent with general economic efficiency in the allocation of resources.<sup>13</sup>

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<sup>13</sup>W. E. Hendrix, "Meeting the capital and credit needs of southern agricultural development," paper presented at annual meeting of Southern Econ. Assn., Atlanta, Ga., Nov., 1958.

**RUSSELL C. ENGBERG**  
Farm Credit Administration

## *Lenders' Problems in Meeting Changing Credit Needs*

**L**ENDERS MUST DO MORE than simply provide the amount of loans needed if they are adequately to serve the credit needs of a dynamic agriculture. The quality of credit service is equally important. In this sense, quality includes competent and intelligent evaluation of the prospects and risks in the operation to be financed, counseling on financial management when appropriate, and adaptation of the credit line to the individual requirements, including particularly the schedules of advances and repayments. In short, quality takes account of the best interests of the borrower as well as the safeguarding of the lender's investment in view of current and prospective conditions.

This chapter is concerned with some considerations on the part of lenders in providing the quantity, but more particularly the quality, of credit required by our rapidly changing agriculture. Some of these considerations have been discussed in previous chapters but merit additional emphasis or comment. To a considerable extent, the viewpoints will reflect the lending experience and credit policies of the cooperative Farm Credit System.

### ADEQUACY OF SUPPLY OF CREDIT FOR AGRICULTURE

There is general agreement that the total quantity of credit available to agriculture is adequate for the needs (cf. Chapters 3 and 12). The lenders serving farmers and their cooperatives must compete in the market with demands for credit from other segments of the economy. This competition is very active since other users of the nation's credit supply overshadow the needs of agriculture. On December 31, 1959, the total net public and private debt in the United States was \$846 billion, of which the portion owed by individual farmers was \$22.9 billion, or only 2.7 percent. The agricultural credit facilities appear to be able to compete satisfactorily with other users for the supply of credit available in the market providing, of course, the lenders serving agriculture are willing to pay the market rate of interest (cf. Chapters 17 and 18).

While the over-all supply of credit available to agriculture appears to be adequate, individual lenders may find it necessary from time to time to restrict lending because of limited funds. Occasionally,

commercial banks find themselves in this position because of inadequate capital or heavy investments in other fields. Duggan referred to such possibilities in the Southeast in his discussion of Chapter 3. Diesslin expressed concern in Chapter 13 about the possibility that some life insurance companies may leave the farm mortgage lending field. This would be unfortunate if they should shift investments in that way. There are times when the lack of funds restricts lending by the Farmers Home Administration.

But there are enough lenders and the competition is sufficiently active so that if one credit source holds back on new loans for some reason, other lenders can take up the slack. One can speak more definitely about the way the cooperative Farm Credit System functions in this respect. Its 494 Production Credit Associations and 800 Federal Land Bank Associations serve individual farmers in every farm community of the nation. Through their fiscal agent and sales organization of several hundred security dealers, the Farm Credit Banks obtain from the investment market the loan funds needed by the Associations to handle local demands for loans. Experience during some business cycles has demonstrated that while interest rates vary with the market, the System can obtain whatever loan funds are required even during tight money conditions. Funds borrowed by the System in the investment market are reaching sizable proportions, totaling \$3.3 billion in the calendar year 1959, and the System has the expansion capacity to fill any gaps in business-type credit service that may develop.

A further point to be noted in connection with any question about the adequacy of the total amount of credit available is that the nation has not failed to get needed agricultural production because of a short credit supply. On the contrary, there have been charges that lenders have contributed to excessive production — as in the case of broilers. In the aggregate, therefore, the problem faced by lenders is not whether the over-all quantity of credit will be adequate. The critical issue is whether they can adapt the quality factors adequately to farmers' needs in these changing conditions and still keep risks within limits that can be tolerated by business-type lenders.

Hendrix and Lanham deal with some of these issues as applied to low-income farmers in Chapter 14. They conclude that lack of capital and credit is not the basic cause of chronically low incomes in agriculture. The problem arises, rather, from an oversupply of labor and accompanying low returns to labor inputs. The low returns are partly the result, also, of low labor and management capacities.

These circumstances present a problem to business-type lenders in cooperating in low-income area improvement efforts. In view of the situation described by Hendrix and Lanham, financing risks tend to be high. In efforts to assist in local Rural Development programs, the Farm Credit Banks and Associations have found that the number of loans they can make is limited. As Hendrix and Lanham point out, however, there are individual farmers who have the management capacity to use capital effectively and who can be financed on a sound basis. Any



business-type lender attempting to serve low-income areas constructively must be competent to identify these farmers and assess their potentials. Lenders having adequately trained personnel in their offices may be able to contribute substantially to Rural Development programs through credit counseling as well as by making loans.

## PROBLEMS OF LENDERS

Turning now to the problems of lenders in financing commercial farmers, there are two areas where the effects of changing agricultural conditions need consideration. One is the effect upon needed changes or modifications in credit service. The other is the effect upon lending risks.

### Suggested Changes in Credit Services

Diesslin and others have mentioned a number of changes that are needed to keep credit service up-to-date with needs. These ideas include intermediate-term loans, partial amortization, open-end mortgages, and package credit. One more feature — greater emphasis on credit counseling — might properly be added to this list.

Intermediate-term loans. The increasing investments in nonreal estate capital assets have been accompanied by demands for loans with intermediate terms. While lenders may appear to have been slow to respond to this need, actually they have financed very substantial amounts of intermediate-term types of investments. This has been done by making shorter term loans and then renewing portions used for capital financing under appropriate circumstances. Substantial volumes of such renewals are planned in advance when the loans are made. Such financing is reflected in PCA loan files by the numerous accounts where loan balances fluctuate with seasonal needs but never drop below the amount representing capital financing over long periods.

The PCA's have been writing notes with intermediate terms, also, for those farmers who prefer it done that way. Starting in 1955 on an experimental basis, the volume has steadily grown, amounting to 12 percent of all PCA loans outstanding on June 30, 1959. Two aspects of such loans should be mentioned. As Diesslin points out in Chapter 13, there are certain conditions and circumstances when intermediate terms are not appropriate, particularly when the risks are such that close control should be maintained by the lenders. The other is that after some experience with having separate notes for seasonal and intermediate-term credit needs, some PCA members voluntarily turn to the more common practice of making an annual review of over-all credit needs and setting up a credit program tailored to the specific requirements of the oncoming year. These two features will continue to limit the amount of PCA credit which will show up in the statistics of intermediate-term loans.

Amortization of farm mortgage loans. The growing interest in

partial amortization of farm mortgage loans is another reflection of changes in both agricultural conditions and the values held by farm people. At the time the Farm Loan Act of 1916 was enacted, a common view was that debt was a necessary evil and a farm free of debt was accepted as the goal of all farmers. Amortization was made a requirement for all Federal Land Bank loans in order to hasten the day when the mortgage could be burned.

One effect of changing economic and technological conditions is that the urge to retire debt is giving way to the steadily mounting capital needs of the modern farm (cf. Chapters 6 and 7). Hence, income or funds that might be used to pay off the mortgage can be invested more effectively in other parts of the farm business. In recognition of this trend, the Federal Land Banks were authorized in 1959 to make loans that are only partly amortized, or that will not be amortized at all. These new tools will be tried cautiously, and through experience the circumstances and conditions appropriate for each type of repayment schedule will be worked out (cf. Chapter 17).

Open-end mortgages. Open-end mortgages, under which a borrower could obtain additional advances within stated limits without new appraisal or a new mortgage, also have been suggested as another way to give greater flexibility in credit service. This idea has been discussed in the Federal Land Bank system for many years, and one bank has tried writing such loans in a very limited way. In principle the idea has merit. However, because of wide variations in state laws and because of numerous practical operating difficulties, the Federal Land Banks have not yet found it feasible to offer this feature of loan service.

Package credit. For several years Diesslin has been saying that "package credit" will better serve the needs of modern farmers than financing on a commodity or piecemeal basis. His definition of package credit is closely approached in PCA operations. When financing a farmer or rancher, a PCA prefers to furnish all of the credit needs other than the long-term real estate loan. The typical procedure in making a PCA loan is to set up a budget of the total operation of the farm showing expected income and expenses with probable dates and sources. From such a plan, the total credit needs can be determined with dates when advances will be needed, the sources of repayment, and the dates when funds will be available for principal payments. This takes account of the total farm operation and makes it possible for all but the long-term credit requirements to be handled as one package. It fits the line of credit to the needs of the farm as a unit covering both short- and intermediate-term requirements.

A debatable question may be whether this arrangement is seriously defective because the long-term credit needs cannot be supplied by the same lender. There may be practicable problems for the lender in consolidating the long- and short-term financing. The investment market for long-term funds is in effect separate from the market for short-term funds, and financial intermediaries tend to become specialists in particular types of financing. To a limited extent commercial banks

can make both long-term and short-term loans from the same general source of funds. But lenders obtaining funds from other sources tend to be specialists. This tendency is observed in both the agricultural and nonagricultural sectors of the money market.

This institutional arrangement may not be an insuperable barrier to working out package service. It may be that the advantages of package-type service to the farmer can be realized almost as well through what may be called "one-stop service" where both types of credit are available under one roof or in adjacent offices. Such close working relationships between long- and short-term lenders have been developed extensively by PCA's and FLBA's. Commercial banks which also act as loan agents for a life insurance company are another illustration of such one-stop service.

Credit counseling. Still another way in which lenders may adapt credit service better to changing needs is through increased competence in credit counseling. As commercial farming increases in complexity and size, management skill becomes correspondingly more important. As capital requirements also increase, skill in financial management becomes particularly important. Competent lending personnel to advise on such management problems not only can do a better job of loan analysis, but also can be of real service to farmers (cf. Chapter 11).

The Farmers Home Administration and the Banks for Cooperatives have demonstrated the value and possibilities of credit counseling. In one Farm Credit district, managers of PCA's and FLBA's stated during a series of meetings that their current experience with farmers' needs and demands indicates advances in credit service to individual farmers should be in the area of credit counseling. Business-type lenders will need to determine how much time they can afford to give borrowers within the limits of available income. They may experiment with charging fees of borrowers who wish more attention than can be given under the normal income from the loan. Such an arrangement might be similar to the "farm management loan" idea advanced by Murray in Chapter 11.

### Effect of Changes in Agriculture on Risk

In addition to adjustments in credit service, lenders also must give attention to changes in risks that may accompany the changes taking place in agriculture. In discussing the effects on risks, Diesslin points out that since the long rise in farm earnings and farm land values is at or near an end, lenders must give closer attention to farm earnings and the related capacity to repay debts (Chapter 13). During this period of "windfall gains in asset values," lending has been relatively easy. But with the present outlook, loan committees have a much more difficult job of screening applications and deciding which operators will have the necessary debt-repayment capacity. New classes of marginal farmers are emerging (cf. Chapter 1).

Several factors or developments which will affect repayment capacity



generally, and the area of marginal operations particularly, have been cited. Technological advances and the rapidly changing size and scale of commercial farming operations have greatly widened the difference in earning capacity of both farms and operators. This trend will continue and will increase the difficulty of screening out those with inadequate earning capacity.

Effect of differences in land qualities. As far as differences between qualities of land are concerned, it has long been recognized that the difference in debt-paying capacity between good and poor land is significantly greater than the difference in market values of those classes of land. Poor land generally is over-valued, while the best land may be under-valued by the market. Most of the losses sustained by the Federal Land Banks resulted from lending too much on the poor lands. Losses from loans on the better farms were negligible. One effect of the current agricultural revolution has been the widening of the differential in debt-paying capacity between good and poor land. If this is the case, much more careful appraisal of farm land for loan purposes will be necessary.

Effect of management differences. Of greater importance is the widening of differences between individual operators in their ability to manage the resources at their disposal. In Chapter 13, Diesslin suggests that the real net income to a given "bundle" of resources increased for the best third of commercial farms between 1940 and 1960, changed very little for the middle third, but has been cut in half for the lower third. In other words, he suggests that the change in the differential between the net incomes of the upper and lower thirds during this period may be indicated by a change in ratios from 3 to 1 to about 8 to 1. These particular ratios are hypothetical, of course, and illustrate mainly the direction of change. This widening differential reflects the differences in the competence and ability of farm operators. As scientific knowledge increases, as technology advances, and as the amount of capital used by individual farmers expands, competent management becomes increasingly important. Subject to effects of market conditions, weather, and other factors, management accounts for the differences between profits and losses in farming more than ever before.

Management may be of equal or possibly greater importance than amount of capital in affecting earnings and debt-paying capacity. In Chapter 4 Martin recognized that ample capital is necessary to permit the size and character of operation which will yield a satisfactory income; and credit, of course, is an important way of increasing the capital available to a farmer. But Martin points out that there is no gain in granting additional credit or expanding the capital resources in some other manner to an individual farmer who does not have the ability to manage it in a way that will produce a proper return. Productivity of capital or credit in the hands of low-capacity managers may not be great enough to justify a financing program.

These arguments emphasize the necessity of taking an even greater account of the personal factor in future financing. The personal factor

has always been of major importance in acting on loan applications. The changes occurring in agriculture are making it still more important. Greater emphasis on managerial ability increases the need for research work that will describe more completely the earmarks of a good manager (cf. Chapters 20-23). Such research results would aid lenders in identifying loan applicants who have the ability to use additional capital effectively.

Another widening differential cited by Diesslin is that between commercial and noncommercial farms (Chapter 13). The smaller noncommercial farmer simply does not have the resources necessary to produce an adequate income. Small farmers are finding out that they cannot compete and are dropping out and turning to other occupations in increasing numbers. The lender, therefore, must be able to distinguish between those who can build to a satisfactory commercial level with the aid of credit and those who will be better off if they shift to some other way of making a living.

In addition to increasing the problem of the lender in identifying operators who will have the necessary debt-paying capacity or who can be built up to that level, these developments are calling attention to the hazards involved in low-equity financing. In Chapter 17 Governor Tootell points out that the conditions that contributed to the success of low-equity mortgage loans by the Farmers Home Administration from 1935 to 1960 and the 75 percent Land Bank Commissioner loans made from 1933 to 1946 are not likely to be as favorable in the 1960's. Under the present outlook for farm income and land values, the risks in making such low-equity loans will be far greater than under conditions of rising farm income and land values.

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## *Adequacy of Credit for Commercial Agriculture in a Growing Economy*

THIS CHAPTER is concerned with the problem of financing commercial farmers. It is a different problem from those discussed in some of the previous chapters which have dealt largely with poverty in agriculture. As a national problem, poverty in rural areas is perhaps more important than financing commercial agriculture, and it no doubt demands serious consideration. But poverty is much broader than a farm credit problem. We can no more solve the social problem of poverty in agriculture with credit than we have been able to solve it with an agricultural price support program. In both instances the problem is merely perpetuated.

### DEFINITION OF CREDIT

Credit is defined here as the ability to sell debt.<sup>1</sup> In this sense, banks do not extend credit but the borrower does; he exchanges credit for cash. Viewed in this way, credit is a commodity which a person or firm possesses. It can be both created and destroyed.

The price which a specified firm's credit can command from different lenders on a given day in the market likely varies surprisingly little if the same facts are known equally to all parties. That is to say, the criteria by which a firm's credit is evaluated (priced) tend to be quite consistent among lenders in a given geographic area at a given time. Of course, these criteria do differ among areas and they do change over time. Examples are numerous, even in the twentieth century, where bankers with imagination and courage have developed new and bold criteria for pricing the credit of farmers, farmers' organizations, and firms serving agriculture.<sup>2</sup> More research is needed to determine and appraise the processes and criteria by which farm credits

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<sup>1</sup> Before the Civil War, Lawyer-Economist Macleod wrote: "If it were asked what discovery has most deeply affected the fortunes of the human race, it might probably be said with truth — the discovery that debt is a marketable commodity." Quoted by John R. Commons, *Institutional Economics: Its Place in Political Economy*, University of Wisconsin Press, Madison, 1959, p. 397.

<sup>2</sup> Marquis James and Bessie R. James, *Biography of a Bank*, Harper & Brothers, New York.



are valued in the capital market and how these might be modified to the benefit of all parties.

As an illustration, over the years different kinds of insurance programs have been developed for, or applied to, agriculture, thereby reducing some of the risks inherent in farming. Hail and frost insurance on crops, fire insurance on farm assets, and life insurance for the farmer are examples. Traditionally, farmers use insurance sparingly, relative to the risks associated with their business. However, many farmers and bankers are aware of the fact that adequate insurance materially alters the price of credit. That is, insurance alters the amount of cash for which they can exchange their credit or the amount of debt they can sell. Whether or not the benefits of a particular insurance program exceed the costs is an issue which each farmer must resolve considering his own circumstances. More attention should be given to this aspect of credit. For example, a wider use of futures contracts by farmers as a hedge against price declines can materially increase the volume of loanable funds to a potato farmer. Similarly, credit insurance, to which Diesslin refers in the closing paragraphs of Chapter 13 and which is being used in other areas with apparent success, might well be used in financing commercial agriculture.

The definition of credit as the ability to sell debt makes both clear and reasonable the proposition that in order for a farmer to obtain money from the capital market he must possess credit. He can no more exchange credit for cash when he has no credit than he can exchange cattle for cash when he has no cattle. It becomes imperative that farmers build a strong credit base and credit rating so that this "commodity" can be sold at a favorable price in the financial market. As is stressed in Chapters 12 and 18, farm credit increasingly must compete with that of other industries and businesses for the limited supply of loanable funds in the market.

### SOME LIMITATIONS OF BROAD-AGGREGATIVE COMPARISONS

Based on comparisons of estimated returns to capital in agriculture versus other industries, using very broad aggregations, Baughman and Wetmore conclude in Chapter 12 that total capital in agriculture appears to be in excess of the optimum amount. Similar conclusions using essentially the same macroanalysis are cited in other chapters. Without disagreeing, these conclusions based on such broad aggregation are of limited use — either in defining agriculture's problems or in developing corrective policy. Diesslin correctly stresses in Chapter 13 that agriculture is becoming increasingly varied. The returns to superior management have never been so great nor the cost of inferior management so severe (cf. Chapter 23). Likewise, differences in land and water quality, climate, and scale of operation appear to be increasingly important.

There simply are too many vastly different universes included in our statistics on American agriculture to permit them to be analyzed as a

single homogeneous body. To conclude from aggregative comparisons that agriculture has no severe capital supply problems, overlooks many farms operated by capable managers but located in areas which industry by-passed and which have no correspondent ties with metropolitan banks. Similarly, such generalization glosses over other areas where new technology, new products, or new markets offer investors opportunities for unusual financial reward.

Based on macroanalysis one can easily conclude, as do Baughman and Wetmore, that the prospective need is not to attract additional capital, but rather to provide for transfer of ownership of assets to fewer and larger units. But in regions where agricultural adjustments already have occurred, history does not substantiate this claim. For example, New England has undergone severe adjustments since 1910. In 1960 there was but a fraction of the number of farms and farmers which existed in that area in 1915. Production has been concentrated into relatively few farms. Many farms — including buildings, fences, and machinery — have been released from cultivable farming and abandoned to unplanned forests. In the process of adjustment, however, much of the agricultural capital of the region in 1910-1920 became obsolete. New capital was needed to develop the larger, consolidated farms on the bottomlands and to equip them with modern buildings, machinery, and equipment.

In the adjustments with which most of agriculture is confronted in other areas (although the situation is most critical in the Southeast and in the cutover areas of the North Central and Northwest, it is not limited to these regions), there will be additional conversions of cultivable land into forest, and abandonment of farmstead, fences, and machinery. At the same time, with new consolidations of productive land, there will be many opportunities for investment in such farm improvements as land leveling, drainage, supplemental irrigation, modern machinery, and improved foundation breeding stock. Outside capital will be needed and attracted.

### THE ROLE OF EQUITY CAPITAL IN AGRICULTURE

The dominant role of equity capital in agriculture has been emphasized in other chapters. This is the only conclusion one can reach based solely on summary tables of the Balance Sheet of Agriculture. The author agrees with those who feel that the importance of equity capital in financing agriculture has been overemphasized. On a national scale, it largely represents inflated values of the same quantity and quality of land resources that have existed since about 1920. If land values have reached their peak, this equity will not continue to grow. Instead, it might decrease. One must look more and more to sources other than this traditional form of equity capital to finance agriculture's adjustment.

In the past, the insistence of many farmers on limiting the rate of their firm's growth to that at which the farm family could accumulate

equity capital has tended to (1) place the family under such an accelerated saving program that some aspects of the family's personal welfare were neglected, and (2) restrict the scale of operation to less than optimum for the capacity of management. The situation is beginning to change since in some farming areas more emphasis is being given to resource control and less to ownership.

Vertical integration is modifying the equity capital structure in some areas, as indicated in Chapter 8. The author does not agree, however, with those who point to the existence and growth of vertical integration as evidence that financial institutions are failing to meet the needs of agriculture. Vertical integration exists for a number of reasons. The failure of market prices to coordinate sufficiently the decisions of producers — with respect to quality, timing, and efficiency of production — to the desires of consumers is most likely the dominant force. Imperfections in the labor and management markets also have been factors. Of course, vertical integration could not have occurred as it has in poultry production without outside capital. Many of these firms have been able to put together such a coordinated production, processing, and marketing technology — combined with outside risk capital and business management — that they have quality credit to market. The individual farmers who are a part of the integrated unit had few or none of these vital assets by themselves to begin with. The vertically integrated firm is thus able to sell its debt to banks, and then "retail" the funds thus derived to the grower under a program of strict supervision. Although such supervision is costly, it already is necessary to the production process, and little or no additional cost is incurred in also supervising the financing. Financing institutions are not able to charge a rate sufficient, in most instances, to pay them for making "farm management" loans, i.e., loans under close farm management consultation and supervision (cf. Chapter 11).

More important than vertical integration in modifying the future capital structure of agriculture will be the increasing use of the corporate entity which offers such advantages as: (1) Under corporate organization, the continuity of the firm is less dependent on the continued survival of specific individuals; (2) it provides greater tax flexibility — including income taxes, inheritance taxes, and gift taxes; and (3) it can help provide a more continuous supply of capital. The corporate organization per se is not in conflict with efficient, commercial family farms.

## ESTATE PLANNING AND TRUST MANAGEMENT

There is no other industry in which capital assets are a vital part of the business where so little attention is given to estate planning. Farmers traditionally have given little attention to this matter. And yet, few other businesses have as much to lose from inadequate or improper estate planning. Furthermore, with the changing organizational structure of agriculture and the increased role of equity capital owned



by parties distinct from management, there is an increasing need for experienced trust management of agricultural properties. Commercial bank and trust companies are strategically equipped, institutionally, to provide this service. Personnel must be professionally trained and experienced, however, to manage the agricultural properties. In too many instances, trust departments of country banks have the reputation of being efficient farm real estate liquidators.

In defense of their position, however, it should be pointed out that in many states the courts do not recognize the differences among management inputs required to manage an agricultural trust as opposed to a portfolio of securities. Consequently, the court fails to compensate the trustee for the added cost of managing farm properties, and the trustee has only one alternative — convert the farm assets into securities which can be managed at a cost commensurate with the court's allocation. This whole area of estate planning and trust management contains another very important set of problems for research and extension which agricultural colleges and other research groups have largely overlooked.

#### GETTING FUNDS FROM SURPLUS TO DEFICIT AREAS

Baughman and Wetmore correctly stress in Chapter 12 that agricultural loans are becoming more closely linked with urban and industrial supplies and demands for funds. They imply that agriculture's isolation and insulation from the forces operating in the financial centers have worked to its advantage. They argue that closer linkage with the financial centers probably will be disadvantageous to farmers. This is true only under very special circumstances — i.e., in periods of very tight money, such as the period since mid-1958. Historically, most isolated farming areas have been classified "capital deficit." Isolated independent unit banks can loan only a fraction of the bank deposits in that area. Their limited funds can be augmented by correspondent city banks, but correspondent banking is considerably less effective than a branch banking system in equating demand and supply of loanable funds among areas and among industries. There are instances where a branch bank in an expanding, isolated, and totally agricultural area has had loans outstanding equal to nearly four times total bank deposits in that area — a loan-deposit ratio unheard of for a unit bank. The impact of these funds on the economic development of the locality is tremendous.

Also, a country bank can augment its loanable funds by organizing an agricultural credit corporation with which it can secure funds from the financial centers through the Federal Intermediate Credit Banks. Because banks failed to utilize this service, Congress established the Production Credit Associations in 1933. Local PCA's, operating through the FICB's, have been quite successful in funneling funds from surplus to deficit areas.

One important consideration in the adequacy of agricultural credit deserves at least passing comment. It concerns organizing agricultural

credit institutions so as to minimize the impact on the lender of the risks inherent in agriculture. For example, as with unit banks, PCA losses in a specific locality are borne entirely by the local unit. This forces association managers and lending committees to be more conservative than they otherwise need be. Since unit banks and PCA's face the same problem — concentrating their loanable funds to agriculture in a single geographic area — one might expect them to behave in about the same way with respect to risk; and, in reality, most of them do. A method is needed for broadening the lending base geographically. For PCA's, the forthcoming acquisition of the FICB's and the profit and loss pooling which this will make possible, should go far in correcting the situation. For banks, branch operation must be ranked above correspondent banking as a means of spreading geographically-oriented agricultural risks for commercial banks.

### COMPREHENSIVE CREDIT SERVICE

Much has been said in Chapters 11, 13, and 15 about "package credit," a "balanced credit program," or "comprehensive credit service." These terms have been used to mean different things to different people. In general, however, the authors have expressed opposition to piecemeal financing under which a farmer gets part of his capital needs from uncoordinated places for uncoordinated purposes. It is agreed that the farmer should be able to secure a complete and well-balanced financial meal at one table and, if possible, at one sitting. Time and again there are cases where an otherwise sound short-term credit program is jeopardized by unwise long-term financing from a different source, and vice versa. The advantages of coordinated complete financing with one institution are undeniable.

In Chapter 13 Diesslin suggests that package credit "can be provided best in financing the farm as a single unit of operation and not by breaking it down into short-, intermediate-, and long-term segments." This proposal is questioned here. Diesslin appears to be recommending that this complete and balanced meal be achieved by throwing these choice ingredients together and serving "hash." Certainly hash is esthetically less satisfying. Furthermore, it requires more confidence in the cook — and this is a key issue in an undertaking where mutual confidence is critical. An annual "budget" loan designed with — and for — the individual farmer and geared to the expected flow of money into and out of his business is a useful tool with which to meet a farmer's seasonal operating expenses.<sup>3</sup> Similarly, intermediate- and long-term loans are useful tools with which to meet problems for which they were individually designed. Diesslin's recommendations would seriously diminish the usefulness of these tools.

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<sup>3</sup> Not only is it useful to the lenders, but to the farmers as well. Our experience is that once a farmer has brought his level of planning and management up to the standard required to operate within the "spirit" and framework of the budget, he becomes a strong advocate of the method.

Diesslin further suggests that long-term credit be used when borrowed capital is needed continuously over a period of years, whether the funds are used for a long-term investment or a series of short-term investments. He adds that "as much long-term credit as possible should be used" to finance intermediate-term improvement programs, and suggests that amortization be extended over a long period — 10 to 20 years in some cases — so that repayments will be low.

In essence, Diesslin is asking for the kind of financing that a large industrial corporation obtains from selling public debentures. This, however, requires a type of credit few farmers have to sell. Rather stringent conditions must be met before the SEC permits a firm to sell debentures to the public. Furthermore, unless the firm is in a strong financial position and has a good business reputation, the rate would have to be exorbitant to attract risk capital. Consequently, most small business firms — including most commercial farms — find that lending institutions, rather than the public, are the best market for their type of credit.

Diesslin's suggestions (Chapter 13) for modifying agricultural credit programs can be evaluated in terms of three primary issues:

1. Adequacy of funds. A financial program should make enough money available to meet the total needs on which both the farmer and lender agree, and should be available when the farmer needs it. The suggestions are sufficient on this count, but they are not necessary.

2. Control. Sufficient control must be provided to assure (a) that the money will be used for the purpose for which it was allocated and (b) that the expected income derived from the financed activity will be used to apply on the loan as agreed by both parties. Frequently this control is as essential to the farmer as to the lender. Control is critical in all businesses and business arrangements. Controllers' departments and budget bureaus do not exist only to make arbitrary rules for operating departments. They are a necessary part of every business. The more dynamic the business, the more important are planning and control. Proper control would be more difficult if all of Diesslin's suggestions were followed.

3. Flexibility. Adequate provision must be made for flexibility in the program. In any dynamic business, conditions change — sometimes suddenly — calling for a change in plans. Agriculture is classic in this respect. The principal argument for Diesslin's request for long-term loans to finance short-term investments is to provide a maximum of flexibility by allowing the farmer to accumulate and hold cash. He appears to favor open-end and partially amortized mortgages for the same reason. However, "capital flexibility" comprises more than the form in which the loan is made. It requires having uncommitted funds available on short notice. The farmer need not have cash if he has credit (marketable debt). Therefore, a farmer should not only build up his credit rating so that he can exchange it for more capital when he needs it; he should reclaim his credit (i.e., pay off his loan) under favorable circumstances so that he can again exchange it for capital if and when



no credit reserve and, therefore, limited flexibility. Generally speaking, a farmer can hold credit cheaper and more securely than he can hold cash, and if his rating is good, his credit provides him the same flexibility as does an equal volume of cash.

Again, this writer agrees with those who argue for complete package financing, wherein the banker and farmer jointly work out a complete financing program fully coordinated to meet all the farmer's needs. In most cases this program will consist of at least three parts, all of which are coordinated so that they dovetail together to form a coordinated program. They are: (1) Long-term real estate loans. Flexible payments might very well become the accepted procedure for farm real estate loans of the future, although partially amortized loans will be made only by those lending institutions which have long-run equity-type capital to invest. (2) Intermediate loans of various sorts, wherein the repayment schedule is geared to the earning capacity (but does not exceed the economic life) of the asset being financed. (3) Annual operating loans which follow a budget carefully planned to coordinate with the fund flow of the farm business.

### NEED FOR AGRICULTURALLY TRAINED MEN IN BANKING

Obviously, a high standard of performance can be obtained only when an alert banker who understands agriculture sits down with a competent farm businessman. It is happening, although only in a few places. However, in almost all areas progress is being made in bringing persons trained in agriculture into the banking profession. But this process is too slow to meet the needs. Special training is needed for those already in banking who have no background in agriculture. Bankers, of course, are like everyone else in that they have an instinctively negative reaction to things they do not understand. Without question, the extent to which bankers understand agriculture affects the adequacy of agricultural financing.

The Bank of America in the mid-1950's began special training programs conducted by the state university and state college systems. These intensive programs are generally of two-weeks' duration. Their primary objective is to acquaint bankers with the agriculture of their state from a farm manager's or decision-maker's point of view. Four such seminars were conducted in 1960, each on a different campus and each specializing in a different type of agriculture. These training programs are opening up new horizons for many of the Bank's officers, helping them to approach the challenge of financing agriculture with more understanding and confidence.

Attention should be directed toward the important differences in the capital structure of agriculture in the several geographic regions of the United States, and to the significant differences in the institutions, terms, and conditions under which capital flows into agriculture in these regions. Greater attention needs to be given to these differences to determine why they exist, and to measure their impact on the productivity, flexibility, and financial condition of agriculture in each area.

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Farm Credit Administration

## *Adequacy of Our Agricultural Credit Structure*

**M**OST OF THE DISAGREEMENTS over agricultural credit in this country stem from differences in interpretation of the word "adequate." The most commonly accepted definition of adequate seems to be "sufficient for some specific requirement." This definition doesn't help much. The approach to be used here in appraising the adequacy of agricultural credit is to consider its relevance to public policy. The test should be whether or not credit practice implements or impedes public policy.

An attempt is made to analyze broadly our agricultural policy in this country with a view to testing credit performance in the light of that policy. It has not been possible to reduce the many aspects of our public policy for agriculture into an integrated whole against which to attempt to evaluate credit adequacy. Therefore, the author has undertaken an appraisal of a very fundamental aspect of the broad national policy.

The Employment Act of 1946, in its preamble, emphasized the objective of full, useful employment of human resources in a manner that will tend to maximize the production of goods and services that society most wants at any given time, and to do this in a manner which will be consistent with encouraging economic growth, stability, and the free enterprise system. Applying this policy to agriculture is interpreted to mean for the future (1) probably considerable decrease in the total number of farms, (2) definitely fewer but larger commercial family farms, (3) probably a considerable increase in part-time farms as industry expands more into rural areas, and (4) drastic reduction in subsistence farms over time, down to what may be considered a practical minimum.

The first three of these four trends have been in evidence for some time and may continue, even at an accelerated rate, during the decade of the 1960's. The fourth, however, is occurring slowly and the reduction in number to a practical minimum will not just happen. It must be part of a very specific policy which is adequately implemented.

### **SOME CONCEPTS OF ADEQUACY OF AGRICULTURAL CREDIT**

There are two extreme views encountered in evaluating the adequacy of agricultural credit. One of these extremes is involved in the

recommendation that credit be rationed as a means of controlling agricultural surpluses. This may involve a recommendation that credit generally to agriculture be restricted, or that it be restricted to the producers of specific commodities which at a given time appear to be in surplus. There are some, if not many, fallacies and problems involved in this point of view. In the cooperative Farm Credit System, the lender's decision in each individual case is considered to be the most practical means of allocating agricultural credit as a resource.

The other extreme is held by those who seem to believe that agricultural credit is not adequate unless it is made available to all who wish to farm in the amount they need, or believe they need, and on very favorable terms. This extreme is mentioned because it is not uncommon, in spite of being in conflict with the objective of efficient utilization of our human resources. It persists because so many people were reared on farms and have a nostalgia with regard to farm life, and they find it difficult to accept the economic realities which require fewer and fewer families in primary agricultural production.

Although this chapter deals with appraising the structure of agricultural credit, it is not the intent here to deal that narrowly with the subject. A meaningful appraisal can be made only in terms of performance. Structure is only one factor involved in performance; more important are the people who extend credit. Their ability, training, experience, and attitude largely determine the performance.

Since colonial times the emphasis in the United States has been upon achieving efficiency of the human factor of production. This has involved associating increasing amounts of capital (including land) with a given amount of labor. Certainly the most important aspect of the agricultural revolution since the beginning of World War II has been the substitution of capital for labor in agriculture (Chapters 6 and 7). During the decade of the 1940's a high proportion of this capital accumulation was financed by farm earnings. However, during much of the decade of the 1950's a considerably higher proportion was financed by credit (Chapter 11). A fair test of the agricultural credit structure lies in the fact that it permitted farmers to increase their borrowings during the postwar adjustment of the 1950's from 10.8 billion to 22.6 billions of dollars. This test becomes even more significant considering the fact that during much of this period the demand for capital was tremendous and credit stringency existed. The agricultural credit structure permitted farmers to compete successfully with commerce and industry for limited capital funds.

#### WILL THE FUTURE REQUIRE LOW EQUITY FINANCING FOR AGRICULTURE?

Credit will play an increasingly important role in agriculture during the 1960's. It will take a great deal of credit to finance the innovations and adjustments which are essential for still greater efficiency in



production. Integrated operations are likely to become more prevalent. Credit may be an important factor in connection with some of these operations. If integration develops to the extent that some people visualize, it could greatly alter the structure for agricultural credit.

Much has been written about the success some farmers have had in contract farming with the integrator furnishing most of the capital. These successes sometimes are cited as evidence that farmers can succeed even though they have a small equity in their operations. This conclusion is not warranted. In the first place, the integrator himself must have a good equity in the undertaking. Furthermore, he has the advantage of decision making, control, and often other advantages which a lender could not hope to have (Chapter 8). The success of a family operating under contract is not comparable with one borrowing on a thin equity.

For the greater part of a generation now, urban homes have been quite successfully financed with low owner equities. Does it follow that a parallel program of low owner-equity financing of farm real estate would be equally successful? There seems to be a growing number of people who believe that it might. Such a situation is basically different. For instance, the city family is not required to invest each year a substantial amount of operating funds which may be two or three times as much as the net income it may reasonably expect from employment. Yet, this is precisely what the farm family does each year, and certainly the risk involved is substantial.

The success of the Farmers Home Administration and its predecessor agencies in making low equity mortgage loans for farm purchase and improvement from 1935 to 1960 is cited as further evidence. Also cited is the relatively favorable experience with the 75 percent Commissioner loans made from 1933 to 1946. Both of these programs were started when farm income was extremely low and the farm real estate market was at a very low point. These two programs were of great value to agriculture, but much of the success of both was due to a rising level of farm earnings — in fact, involving many years of really good earnings — and with it, a rising land market. These factors are not expected to be anywhere near as favorable in the 1960's.

Perhaps the most popular appeal for low equity financing is to help young people who were reared on farms remain in agriculture and achieve the status of owner-operators. The White House Conference on Children and Youth was held during the last week of March, 1960. A press release issued in connection with this conference dated March 2, 1960, stated: "We already know that, with scientific advances which reduce the need for manpower, less than 15 percent of the young people growing up on farms today will stay there in an ownership or managerial capacity." This statement, made by a high-ranking government official, is quite realistic. The author, having been reared on a farm and being a bit of an agricultural fundamentalist, is reluctant to accept this conclusion, although the facts point that way.

Most of these 15 percent will inherit farms through family or

marriage. Others will receive substantial help from relatives, which always has been an important part of farm financing. Some will resort to part-time farming, which is a relatively new rung in the agricultural ladder. To encourage a larger proportion of young people to stay in agriculture by extending them credit equivalent to a very high proportion of their total capital needs would be a distinct disservice to them, to say nothing of being contrary to a policy of efficient resource use.

The author's conclusions on the matter of low equity financing for commercial family farmers are as follows:

1. It might be justified if, as a matter of national policy, it were decided to encourage more people to remain on farms. This, however, is not the case.

2. Agricultural income outlook for the 1960's does not encourage one to believe that low equity financing would be sound.

3. The aggregate equity of American farmers in their farms is very high — approximately 88 percent of the current market value of farm assets.

4. Since commercial family farms may be reduced substantially in the 1960's, there should be available a higher proportion of farmers than ever before with demonstrated managerial ability. The consolidation of farming units should largely be done by these people, and especially by those who have a combination of demonstrated managerial ability and substantial equities in their present farm holdings. The land ownership adjustments should emphasize keeping farms in strong hands which are most likely to succeed in the highly competitive situation that lies ahead.

5. Over-lending is a great disservice to farm families. If real estate loans are made representing substantially more than traditional lending ratios, what relief can be made available when deflation takes place? With the high agricultural productive capacity that exists in the United States, prices for farm land will not continue the trend upward indefinitely. As a matter of fact, some reduction in land prices is already overdue.

These conclusions with regard to financing family-type farms in commercial agricultural areas may seem harsh. The author believes, however, that they are in the interest of farm people and the nation generally. A somewhat different view is held with regard to the matter of credit needs in chronically low-income agricultural areas. It has been demonstrated that adjustment in these areas takes place very slowly unless special assistance is given. There is no question but that low equity financing of the better qualified farmers in these areas, coupled with supervision and technical assistance, is necessary to achieving consolidation, development, and adjustment. This would seem to be primarily a job for government credit.

## FINANCIAL STRUCTURE

To present a discussion more pertinent to the subject of this chapter will require giving some approximate answers to the question: Will the financial structure of lenders permit the expansion of agricultural credit that likely will be needed to finance the adjustments and innovations that seem a certainty for the 1960's? This question will be approached from the standpoint of institutional lenders.

## Commercial Banks

Commercial banks have been the largest suppliers of agricultural credit in the past, and undoubtedly they will continue to be for the foreseeable future (Chapters 3, 5, and 11-13). Governor Shepardson comments with respect to them in Chapter 18.

## Farmers Home Administration

The Farmers Home Administration is not particularly handicapped from a structural standpoint except, perhaps, in the matter of some unrealistic interest ceilings. Its performance is influenced periodically by both executive and legislative interpretations of policy and necessary implementation.

## Cooperative Farm Credit System

This system has built up a total net worth exceeding 1.2 billions of dollars by 1960. Of this, 18 percent is represented by government capital, 28 percent by farmers' capital, and 54 percent by earned net worth. In addition to this capital structure, the Banks for Cooperatives, the Intermediate Credit Banks, and the Production Credit Associations have access to certain revolving funds which may be made available by the Treasury if loan demands require it from a ratio standpoint.

The Federal Land Banks would be able approximately to double their 2.4 billions of dollars of real estate mortgage loans if necessary.

The Banks for Cooperatives have a capital structure which would permit them to more than double their lending volume. Farmer cooperatives are expected to play an increasingly important role, especially as integrators and as bargaining agents for farmers. They will have need for larger amounts of credit.

Production Credit Associations have a capital structure which, taken with revolving funds that could be made available to them, would permit a doubling of their loan volume.

The Federal Intermediate Credit Banks, which have had a very rapid growth in loan volume since 1955, would not be able to double



their volume of business unless additional capital were made available for ratio purposes.

## SOME OBSERVATIONS ON THE COOPERATIVE CREDIT SYSTEM

The cooperative Farm Credit System has decentralized its operations to a great extent. It has also experienced a very rapid growth in loan volume which has increased by approximately 105 percent since 1954, reaching a peak of \$4 billion in 1959. This was during a time of considerable money stringency, a period in which the system proved itself capable of competing for funds in the capital markets. As a matter of fact, some of this increase in volume occurred because competing lenders were short of funds or chose more profitable nonagricultural investments. This period has proven that the greatest value of the cooperative Farm Credit System is the dependability which it has demonstrated in making credit available to qualified borrowers at all times.

The Farm Credit System imports capital funds from urban centers rather than relying primarily on local capital for loan funds. Production Credit Associations, for instance, do not compete with local banks for deposits or other types of customer services. They are simply in the specialized business of making agricultural loans.

The purposes for which loan proceeds from the System may be used are very broad. They are not available just for farm needs. Many family needs — including housing, household equipment, and funds for education of children — have been met over the years with both Land Bank and Production Credit Association loan proceeds. There have even been instances in which loan funds were permitted to finance a family member, no longer needed on the farm, to become established in a commercial enterprise away from the farm. The Farm Credit Banks and Associations have been making reasonable adjustments to the rapidly changing agricultural situation. Some of the innovations that bear citing are:

### 1. Federal Land Banks

- a. More realistic loan levels. The constant problem is to maintain a balanced position. That is, the extension of loans which are sufficiently large to be helpful, but which will not unduly contribute to land market inflation.
- b. Loans to part-time farmers.
- c. Loans to family farming corporations.
- d. Loans on timberland.
- e. Complete removal of loan limits (amount that can be loaned).
- f. Five percent bond rate ceiling removed January 1, 1960.
- g. Nonamortized and partially amortized loans. Legislative authority for these types of loans was granted recently and some experimentation is to be conducted.

- h. Authority to defer principal installments for periods up to five years.
- i. Real estate loans in Alaska. The Federal Land Bank of Spokane has made several.

## 2. Banks for Cooperatives

- a. Perhaps of as much importance as the money loaned has been the counseling and assistance with financial management which the Banks for Cooperatives have given to farmer cooperative associations over the years. This continues to be an important contribution.
- b. Commencing in 1956, the structure of these banks was changed to provide for systematic investment in their capital by farmer cooperatives and a corresponding retirement of government capital.
- c. An important innovation which some of the banks have adopted has been the interest "escalator clause" in their loans. This provision for varying the interest rate periodically with the change in cost of money to the banks has been occasioned by the rather drastic variations in mortgage interest rates in recent years.

## 3. Credit Banks and Production Credit Associations

- a. Many changes have been made to simplify operations in these institutions. Production Credit Associations have made a major contribution to agricultural lending with the budgeted loan program which they pioneered many years ago.
- b. Since their inception, Production Credit Associations have made loans to part-time farmers.
- c. Intermediate-term loans have been an important part of the business of Production Credit Associations for many years. It is, however, only since 1955 that they have been making such loans based specifically on three- to five-year notes.
- d. Financing purchases by patrons of supply cooperatives. In the late 1950's this program gained considerable momentum in about half the Farm Credit districts.

In the matter of structure, there is little to say by way of criticism. Considerable amending legislation since 1953 has resulted in structural improvements. If the cooperative Farm Credit System were to be initiated now with the knowledge available from experience since 1917, there would not be three separate bank systems. Possibly there would be only one, but at the most, two bank systems. One would be a Bank for Cooperatives and the other a bank lending to individual farmers for all of their operational needs.

Tools are available for doing a good, constructive, sound job. In the matter of performance, a rather wide range of accomplishments is exhibited. The Federal Land Banks often do not use a great deal of

ingenuity or effort in attempting to fit loan payment terms to the needs of individual borrowers. There is too much of a tendency for a district bank to adopt either the standard (equal total installments) or Springfield (equal principal and consequently declining total installments) type of loan amortization and to stick to it for all or practically all loans, regardless of which best fits the borrower's needs. Also, the term of years for which a loan is made tends to be stereotyped by districts. There is some tendency to strive for uniformity as between annual and semiannual installment billing, rather than have it coincide with the borrower's income pattern. For years the Land Banks have had the privilege of deferring loan principal installments for as much as five years. This tool is used almost exclusively in servicing problem cases. It could often be used at the beginning of the lending period to give the borrower the opportunity to make further improvements to his real estate or add to his livestock or equipment in a manner that would immediately increase his earning position.

One can prove almost anything as to performance among the 494 Production Credit Associations. There are still a few of the "country club" type which are quite content to serve their limited number of members, that are extremely proud of their record of no losses, and which are overly obsessed with the idea of protecting their reserves. Fortunately, there are very few of these. On the other hand, there are a substantial number of Production Credit Associations that extend very constructive credit service. In between they shade both ways, but the record indicates that the majority approach the latter category. Not enough of the Production Credit Associations are jointly housed with Federal Land Bank Associations, which would facilitate a closer working relationship in the borrower's interest.

As for the Banks for Cooperatives, the author has little criticism since they presumably are making available more than 50 percent of the credit used by farmer cooperatives. Their business is characterized by generally rather large loans and the unique specialized counseling services available to cooperatives.

### SOME CONCLUDING OBSERVATIONS

Our agricultural credit "complex" — made up of individuals, commercial banks, cooperative credit, and government credit — is a very desirable arrangement. These four categories have no rigid spheres of influence and tend to complement each other as well as to furnish some wholesome competition.

Most discussions of the adequacy of credit have to do with quantitative aspects. The qualitative dimension of agricultural credit is of almost equal importance, viz., the matter of counseling on farm business analysis and financial management. Most directors and managers of the Farm Credit System's associations strive to achieve this personalized constructive service. Even the most successful of these men



probably are not aware that they are "rationing capital into agriculture on a marginal productivity basis," but they strive to make constructive loans which will maximize the income of the farm family and offer the best prospects of repayment.

No appraisal of the adequacy of agricultural credit would be complete without consideration being given to the probable behavior of lenders during periods when farm income is seriously squeezed. Historically, individuals extending credit to farmers are in the poorest position to grant forbearance, be they merchants, fellow farmers, or even relatives. They seldom have the resources to permit them to grant forbearance over a very long period of time.

Local banks usually retrench and tighten up on credit extension during periods of agricultural income stringency. The behavior of insurance companies under these conditions varies considerably. In case of depression they may be confronted with demands from their policyholders which will require strict collection policies.

It is the policy of the cooperative Farm Credit System to grant forbearance to borrowers who are making an honest effort but who are confronted with inadequate income due to no fault of their own. Fine demonstrations of this policy were witnessed when farmers and ranchers in the southern plains area experienced several successive years of severe drought in the early to mid-1950's. The effectiveness of such a policy was also demonstrated in the Mississippi delta area when widespread crop losses occurred due to very poor harvesting conditions in 1957 and 1958. Not since 1940 have the banks and associations generally been put to a real test. Since then their net worth position has been built up substantially, and it is assumed that they will use constructively the various types of forbearance which are legally available to them.

Certainly adjustments must be made in credit to adapt it to the needs of a dynamic agriculture, but business principles cannot be stretched very far without disservice to both borrower and lender. It is important to remember that credit can be substituted for income only within rather narrow limits and for short periods of time. It is not an enduring form of farm relief.

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Federal Reserve System

## *Adequacy of Credit Structure As Related to Commercial Banks*

THE GROWTH in amount and changes in type of the credit needs of agriculture have been discussed at length in other chapters of this book. Therefore, those points which appear to be pertinent to a discussion of the role of commercial banks in the agricultural credit structure will be summarized briefly. First, however, three points that should merit our attention will be mentioned in connection with the broad problem of agricultural credit.

### GENERAL PROBLEM OF AGRICULTURAL CREDIT

Agricultural credit is no longer an isolated or local problem (Chapter 3). It is subject to the same influences that affect the rest of the economic community and must bear its share of the problem of balancing the national demand for credit with the supply of saving. Credit markets have become more unified because of better information and communication. Funds that originate in one section of the country are no longer confined to outlets in that area but seek the most advantageous investment outlet throughout the economy. By the same token, those in need of funds have access not merely to local sources but also, directly or indirectly, to many other sources of credit. This situation has not always been true. There was a time when local credit conditions were insulated to a considerable degree from general credit conditions in the nation. The development of the whole farm credit system, together with structural changes in the commercial banking system and in the regulations governing it, has served to facilitate the mobilization and allocation of credit resources as needed throughout the country (Chapter 19).

The second factor that must be recognized in this connection is the decline in the proportion of agricultural credit to total credit. In 1929, the first year for which reliable figures are available, farm debt was about 6 1/2 percent of total debt. In 1959 this relationship had decreased to less than 3 percent. The reason for this relative decline, of course, is that farm production is a declining proportion of a constantly growing total. Over the same thirty-year period, the ratio of agricultural product to total product declined from 9 1/2 percent to about 4 1/2 percent. It is interesting to note, however, that the ratio of farm debt to farm

product ended this three-decade interval at about the level at which it started.

A third factor at work in the money and capital market is the fact that new additions to capital investment are continuing to "pay off" in the form of additions to net earnings. In this connection, it is important to keep in mind that economic growth, about which there is so much comment, is dependent upon increased productivity per man-hour of labor. This increased productivity, spurred by advancing technology, is implemented primarily through the substitution of capital for labor (Chapters 6 and 7). The doctrine of economic maturity that was expounded in the 1930's has been proven utterly fallacious. Capital has continued to be increasingly productive in many fields, and especially so in agriculture. One of the big questions in connection with our future growth is whether sufficient savings can be generated to provide the capital essential for further technological advances in productivity. This, in turn, leads to the problem of allocating available funds to the most productive use, a problem which will be discussed more fully.

### CHANGES IN CREDIT NEEDS

The need for larger, more efficient units and the accompanying demand for land, augmented by the demands of urban expansion and inflation hedge-buying by investors, has resulted in a greatly increased demand for mortgage credit. There has been growing concern, however, over the continuing rise in land prices in the face of declining farm commodity prices and a corresponding reduction in rate of return on farm real estate which in 1959 fell to an average level of approximately 3 percent. This, together with some reduction in inflationary pressure, may account in part for the withdrawal of some of the investors from the market and the apparent leveling off in farm land prices. In any event, there is still need for further consolidation of farm units, and there is likely to be a continuing strong demand for mortgage credit in all cases where the resulting increased productivity can show a profitable return on the investment (Chapters 7 and 12).

The increased use of purchased inputs has resulted in a growing need for short-term production credit. The biggest change, however, results from tremendous technological advances in machinery, equipment, and facilities, and shifts in major farm enterprises together with major land improvements incident to irrigation and drainage, all of which call for greatly increased amounts of intermediate-term credit geared to the repayment potential of the operation.

In summary, farmers need varying but increasing amounts of long-, intermediate-, and short-term credit (Chapters 11 and 13). While specific uses may be assigned to those several types of credit, the fact is that the several farm enterprises and even the family living expenses are closely interwoven with the success of the operation as a whole. One of the major problems in the future will be the generation of



sufficient savings to provide the capital essential to economic growth. This means that at all times lenders will need to allocate credit carefully and with a close eye to the constructive use and continuing profitability of credit. Adequacy of collateral is important, but extension of credit for an operation that does not give promise of improving the repayment potential of the borrower and that depends upon attrition of equity for its liquidation is of questionable value to either the borrower or the lender. For these reasons there are real advantages in handling the farmer's various credit needs through one source (Chapters 11, 13, and 15-17).

From the standpoint of the lender, farm loans in general are relatively small and the cost of servicing is correspondingly high. Furthermore, if attention is to be given to the constructive use of the loan, the lending institution must be staffed with trained personnel who can appraise the loan in terms of its value to the borrower's total operation and in light of his total financial position. This can be better and more economically done by one lender who is familiar with the total problem than by several who are only interested in separate parts of the operation. The farmer, too, is better served by one lending agency which is familiar with all phases of his operation and the interrelationship of his several credit needs.

### ROLE OF COMMERCIAL BANKS

As holders of demand deposits, commercial banks are limited by liquidity needs in the amount of long-term assets that they may hold. Hence, the holding of farm real estate loans which are relatively non-liquid must be limited. Nevertheless, commercial banks are an important source of farm mortgage credit, and on January 1, 1959, they held \$1,443 million of mortgage loans, or approximately one-eighth of the total and over one-fifth of the institutionally held loans (Chapter 5). Furthermore, many banks have established connections with insurance companies and other long-term lenders whereby such lenders take over the loan and engage the bank to handle its servicing.

In loans other than for the purchase of land, commercial banks have always held a dominant position, and on January 1, 1959, they held approximately \$4 billion of such loans out of a total of \$9.5 billion other than CCC loans (Chapter 11). However, the changes in size and type of farm operations and the accompanying change in size and type of credit needs, including the tremendous expansion in need for term credit with terms adjusted to the flow of income and repayment potential, have presented many problems. It is true that some small country banks have found the credit needs of their larger farm customers to exceed their loan limits. In such cases they have usually been able to secure participation from their city correspondent banks although occasionally they may have had to send the borrower elsewhere for his needs.

In the intermediate-term field, the problem is further complicated

by the need for more adequate analysis of the total operation in order to establish realistic terms, and also by the need for more competent supervision of the loan. Many bankers make what are essentially intermediate-term loans on a short-term basis with tangible or intangible commitments as to renewals. As long ago as 1921, the U. S. Department of Agriculture, in a study of bank lending practices, criticized the unrealistic terms of many farm loans and said, "Some means must be found for providing the crop and livestock producers with credit running for such terms as the nature of their business demands." It should be remembered, however, that banks did little term lending of any kind at that time. Only relatively recently have they ventured into term loans for business and, still more recently, into consumer installment loans. Notwithstanding these later development, a Federal Reserve study of farm loans in 1956 indicated that 60 percent of the banks rarely made nonreal estate loans with maturities of longer than one year, and only 9 percent made extensive use of longer term maturities.

For many years commercial banks generally resisted term loans to farmers, partly at least, on the assumption that such loans were frowned on by the federal supervisory agencies. Any impediment stemming from that cause was removed some years ago when the federal supervisory agencies issued a statement that there is no federal law or regulation prohibiting intermediate-term loans to farmers, and that, "Like all classes of loans, each loan of this type should be evaluated on the basis of its own characteristics, the risk involved, the character, ability and financial responsibility and record of the borrower, value and character of collateral, and the feasibility and probability of its orderly liquidation in accordance with the repayment plan."

While no statistics are available on developments in this area, there are some indications of a marked upward trend in the use of term loans. This has doubtless been accelerated in part by the increased activity of other lending agencies in this area. A further indication of such a trend is the increasing use of agriculturally trained men by commercial banks. According to the figures of the American Banker Association, approximately 900 banks had men so qualified in 1960 compared with 300 in 1950. Most of these men were located in the larger country banks. Many small country banks seem to feel that they do not need or cannot afford such specialized help. In some cases, however, their needs in this connection are served by the agricultural departments of their city correspondents who have found this to be a worthwhile and much needed service. In such cases the city bank farm loan man frequently assists the country bank in the analysis of the farm business, appraisal of the loan, and establishment of terms, and then may agree to participate in the loan to the extent desired by the local bank. Unfortunately, some city banks with a large clientele of small country correspondents have failed to see the opportunity for a real service to their correspondents in this area.

Commercial banks can, and many are doing, an excellent job of meeting the total credit needs of farmers on an enlightened and realistic basis so far as terms and amounts are concerned. With the assistance

of insurance companies and other long-term lenders in the mortgage field, and with the cooperation of forwardlooking city correspondents in over-line participation and in appraisal and supervision of larger and longer term loans, they are able to render competent and efficient service to their borrowers. Through the handling of all of the farmer's needs in one package, they can reduce the cost of servicing and supervision and at the same time provide him with a more convenient one-stop service (Chapter 13).

The Agricultural Commission of the American Bankers Association is working diligently to promote the interest of more banks in this type of service. The amount and complexity of farm credit needs are bound to increase, and it is axiomatic that, unless present lenders meet that need, other agencies will be developed to fill the gap. At the same time, it should be remembered that available credit should be allocated first to its most productive uses in the interest of long-term economic growth — especially in times of credit stringency — and that such uses will in the long run be most profitable to the borrower, the lender, and the community. By the same token, not all requests for credit can or should be met, since extension of credit to an unsound and losing operation eventually results in loss to all concerned. Unqualified borrowers might be better advised to liquidate their operations and get into something with a more promising outlook rather than to hang on to a losing proposition and risk the gradual attrition of the equity they possess.

Finally, while many banks have a higher loan to deposit ratio than in many years and, hence, may need to be more selective in the allocation of available credit, there is no reason to believe that they will not be able to meet all legitimate credit needs of agriculture. It must be remembered, however, that with increased credit demands and with agriculture representing a smaller part of total needs, farmers may face increasing competition from the rest of the economy for available funds.



## **PART IV**

# **Values and Education in Relation to Capital Use and Productivity**

- ▶ **Philosophical Values**
- ▶ **Socio-Psychological Values and Attitudes**
- ▶ **Facilitating Changes in Values and Attitudes**
- ▶ **Human Resource Investments**



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## *Values in the Solution of Credit Problems<sup>1</sup>*

THE PURPOSE of this chapter is to indicate how value studies can contribute to the solution of agriculture's credit problems. The method is historical and the approach is philosophic.

For purposes of clarity in presentation, it will be necessary to have a vocabulary. The discussion will be based also on various assumptions and distinctions not readily apparent in the vocabulary. The vocabulary and meanings attached to the words discussed are presented below.

Concept denotes either a word or a sentence which has a specifiable meaning.

A belief is the meaning of a concept about the nature of reality. This reality includes values. There are not only factual beliefs related to descriptive states of affairs, present or future, but also normative beliefs which include values in all senses that this word is used. In actual occurrence, beliefs include psychological imaging and symbolic expression, but these are not relative to the present discussion.

A fact is the meaning of a concept of "what is" or "what will be."

A fact concept is a word or sentence which has as its meaning an actual state of affairs, present or future.

A value or normative belief is the meaning of a concept of "what ought or ought not to be."

A value concept is a word or sentence which has as its meaning a state of affairs which ought to be or ought not to be.

An instrumental value is the meaning of a concept of "what ought or ought not to be" for which the "ought" is derived from a more basic value. For example, the concept "a man ought to have money" may be based on the more basic value concept that "a man ought to be able to provide food and shelter for his family."

A more basic value contrasts with an instrumental value in that it is a goal for the sake of which instrumental values are actualized. More basic values may ordinarily be actualized by means of a number of different instrumental values. In the example above, providing food and shelter for a man's family might be realized by other means than having money. It should be noted that an instrumental value detached from the more basic value with which it is connected may very well be tenuous in a sense.

An action is an attempt to establish or attain a specified condition.

A goal is a condition, not yet established or attained, which some entity is trying or could try to attain.

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<sup>1</sup>The authors are indebted to Roy Gift, Dale Hathaway, Paul Hurrell, Richard Rudner, and Vernon Sorenson for constructive criticisms and suggestions.



A right action or goal is an action or goal determined to be the best in view of the factual and normative beliefs involved where "best" means "that which maximizes human interests and purposes as indicated by the value concepts involved."

A wrong action or goal is an action or goal other than the right action or goal.

Good and bad are adjectives used to modify the word value according to whether the value under consideration is of the nature "what ought to be" or "what ought not to be."

Right and wrong are adjectives which will be used to modify the words "action" and "goal."

True and false are applied to sentences when they are supposed to express beliefs which do or do not conform to reality.

## ASSUMPTIONS

It is assumed that (1) values can be known and that such knowledge exists; (2) values can be arranged in systematic structures; and (3) knowledge of values is not essentially different from scientific or empirical knowledge. Since these assumptions may shock those persons who ascribe to certain schools of thought or points of view having to do with the philosophy of science, these assumptions will be elaborated upon and clarified. These are matters which cannot be proven any more or less than the axioms of Euclid that the sum of two and two is four — or the law of variable proportions.

### Values Can Be Known and Such Knowledge Exists

Let us start neither with physical science nor with metaphysical speculation. Let us start rather with the facts of human values and ask what is already known about them.

First, it is known that human values are real, but that they are not all of reality. Secondly, it is possible to have knowledge of values, although this knowledge is not a minor branch of physical science nor is it a non-naturalistic intuition of moral predicates. Scientists concerned with a study of values will do well to examine political, legal, and economic history. Such an examination makes it obvious that value concepts exist, are cognitively meaningful, and can be judged as good or bad. In other words, value concepts form a part — and an important part — of the world of our experience. As long as this part of our world is ignored, or exiled outside the province of reason, it will continue to be a source of disturbance and unrest.

Philosophers who have argued that value judgments are meaningless have tended to overlook the distinction between the content of a value belief and the attitude one has toward this content. Human beliefs may be described in terms of their contents, or in terms of the attitudes people have toward these contents. One believes, for example, that Chicago is west of New York. The factual content of this belief is Chicago's being west of New York. One's attitude toward the content of this belief may

be one of gladness or sadness, or indifference. In any case, the content is the same.

Those who hold that knowledge of values does not exist tend to define values in terms of the attitudes held toward the contents of value judgments. To say "charity is good" according to this view is translatable into "I approve charity; do likewise." A criticism of this point of view will be made when positivism is examined. The position taken here is that whether or not charity is good depends not on one's attitude toward charity, but upon the nature of the world as it ought to be or ought not to be — just as Chicago's being west of New York is independent of one's attitude toward this state of affairs. In other words, value judgments are not merely subjective but may be objective.<sup>2</sup>

The content of value judgments showing first how the knowledge of such structures is not essentially different from other knowledge is discussed below.

### Value Concepts Can Be Arranged in Systematic Structures

The content of beliefs may be factual, formal, or normative. The descriptive sciences have impressively organized factual beliefs; the formal sciences (mathematics and logic) have done the same for formal beliefs; whereas normative beliefs have been largely neglected. However, there has been an encouraging increase in concern for normative beliefs and their organization. Writings like Edwards' Logic of Moral Discourse<sup>3</sup> and Edel's Ethical Judgment<sup>4</sup> take up the problem of structuring norms.

The problem of structuring beliefs of a normative type is not basically different from the problem of structuring factual or formal beliefs. In a science (be it factual or normative) the sentences which make it up are clearly stated, consistent with each other (i.e., contradictions are avoided), and can be applied fruitfully to the world of experience. If one departs from these criteria in normative matters, he leaves reason and enters areas of superstition, dogma, or blind intuition. Unfortunately, an over-emphasis of the difference between factual and normative matters has tended to cause men to do just this on normative matters.

<sup>2</sup> "Value judgments need not be, and are not all, in some incurable way, subjective. For in some cases when a man affirms that a thing is good, or that one thing is better than another, there are ways of finding out objectively whether what he is saying is true. . . . There is in some cases evidence sufficient to determine that the assertions he has made are as a matter of fact justified and what he has said can be believed to be true." --Frederick L. Will, "Values, objectivity, and democracy," in *Essays in Political Theory*, M. R. Konvitz and A. E. Murphy (eds.), Cornell University Press, Ithaca, N. Y., 1948, p. 276. Note the difference between this conception of objectivity and the conception which would make objectivity dependent on some religious criterion or natural law. In the latter case objectivity is outside the boundaries of evidence and justification while in the former it is defined in terms of evidence and justification.

<sup>3</sup> Paul Edwards, *The Logic of Moral Discourse*, The Free Press of Glencoe, Illinois, 1955.

<sup>4</sup> Abraham Edel, *Ethical Judgment, The Use of Science in Ethics*, The Free Press of Glencoe, Illinois, 1955.

Normative realism, the position taken here, is concerned with structuring normative beliefs in a reasonable fashion. This is why the study of law is so valuable. In systems of law, an objective set of norms is used which succeeds or fails publicly, and this public success or failure makes it possible to examine the structure of norms and the place of reason in its creation.

### Knowledge of Values Is not Essentially Different From Empirical or Scientific Knowledge

It becomes possible to understand this thesis only when people begin to take seriously the contents of normative beliefs. Men who imagine that reality is made up entirely of factual states of affairs or matters of fact which metaphysically correspond to the contents of factual beliefs are not likely to take seriously the contents of normative beliefs. It is only as one doubts the metaphysics of physical realism that he can take seriously the metaphysics of normative realism. If one takes seriously the reality of norms, then the problem of structuring norms is at least as important as the problem of structuring facts.

But people since the Middle Ages have been mistakenly persuaded that factual beliefs correspond to reality and are objective, whereas normative beliefs do not correspond to reality and are subjective. What does it mean to say that factual beliefs correspond to reality? For one thing, it means there is inter-subjective agreement about the facts. One's belief that Chicago is west of New York is objective because he can make predictions in terms of it, predictions which experience proves to be reliable.

Turning to normative beliefs, at first sight there appears to be no such agreement or possible verifiability. Yet in those areas in which men have worked out conceptual schemes to describe normative beliefs, one finds that there is inter-subjective agreement and possible verifiability. There is impressive agreement about normative reality, and there are predictions which are successfully confirmed in the area of law. In this area there is as much reason to believe that values are real as that facts are real.

The lawyer or jurist is not concerned primarily with the concepts or laws of the physical sciences. Rather, as a lawyer, his chief concern is with norms, and the subject of this concern is as real to him as is the physical world for the physical scientist.

But the most impressive argument for normative realism is that of common sense. The man on the street knows that his beliefs about values are about the real world. As a matter of fact, for most people the physical world has only a peripheral sort of reality. Of greater importance in the world of common sense are the worlds of religion, love, and politics. In other words, the worlds of religion, sex relations, and political activity are worlds which really concern the average man. Physicists can discover new laws, new elements, and new theories without



producing a ripple in the public mind unless values are involved. But let a religious leader conduct a crusade, some hero fall in love, or some politician advocate public ownership of the means of production, and the public mind may be stirred to its depth.

The problem is not one of creating an interest in norms, nor one of making the common man believe in their reality. Interest and belief already exist; the problem is one of structuring those beliefs in an intelligent way, that is, in such a way as to make them clearly understood and logically coherent.

Let us now turn to an examination of some philosophical positions which would hold either that knowledge of values is impossible or that such knowledge is essentially different from empirical or scientific knowledge. The philosophic positions to be examined are normative realism, logical positivism, and intuitionism.

The logical positivists have asserted that the meaning of a proposition is its mode of verification. This sort of meaning criterion has been taken to rule out normative judgments as being meaningless since they can be neither verified nor falsified.<sup>5</sup> Such a meaning criterion may be compared to the value experience of the intuitionist who holds that the meaning of such terms as "right" and "good" are unanalyzable, non-natural, simple intuitions. Such intuitions, according to intuitionists, are as primitive in man's experience as sense-data and can hardly be explained by other concepts.<sup>6</sup> But what is needed is neither a simple meaning criterion nor an unanalyzable value intuition. What is more useful is a systematic meaning context, whether this be the context of ethics or of science.

Too much stress, perhaps, has been placed on a discussion of ostensive definitions and reduction to a verification basis in the philosophy of science. What the scientist finds far more useful is a consideration of explanations and theory construction.<sup>7</sup> Similarly, in ethics there has been too much emphasis on individual value intuitions and too little attention paid to the total context of ethical discussions. This context may be describable either in terms of one's personal morality, or a society's subjective morality, or that objective morality known as a legal system. In any one of these cases the meaning and validation of a particular value judgment is to be explicated by putting the individual statement

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<sup>5</sup>In *Language, Truth, and Logic*, A. J. Ayer writes: "If . . . I . . . say, 'Stealing money is wrong,' I produce a sentence which has no factual meaning. . . . I am merely expressing certain moral sentiments. . . . We can now see why it is impossible to find a criterion for determining the validity of ethical judgments. It is not because they have an 'absolute' validity which is mysteriously independent of ordinary sense-experience, but because they have no objective validity whatsoever." Reprinted in O. A. Johnson, *Ethics: a Source Book*, Holt, Rinehart & Winston, Inc., New York, 1958, pp. 475-76.

<sup>6</sup>G. E. Moore in *Principia Ethica* writes, " . . . 'good' denotes a single and indefinable quality." A. G. Ewing in *The Definition Good*, The Macmillan Co., N. Y., 1947, p. 45 writes, " . . . 'goodness' cannot be defined wholly in non-ethical terms."

<sup>7</sup>For reading on this topic, see Carl G. Hempel, "The theoretician's dilemma," *Minn. Studies in the Philosophy of Science*, Vol. II, pp. 37-98; and Carl G. Hempel, "Problems and changes in the empiricists' criterion of meaning," *Revue Internationale de Philosophie*, Jan., 1950, pp. 41-63, reprinted in Leonard Linsky, *Semantics*, University of Illinois Press, Urbana, 1952.

into a systematic context. Some believe that this would resolve the problem of the so-called dichotomy between value judgments and factual statements.<sup>8</sup> Upon examination of such a context of ethical discourse, one would discover that the universe of discourse appropriate to ethical discussion can be judged in terms of the same criteria as those used in ordinary science.<sup>9</sup> These criteria are consistency and clarity.

In his book on the Nature and Significance of Economic Science, Lionel Robbins defends the positivistic thesis that: "Economics deals with ascertainable facts; ethics with valuations and obligations. The two fields of enquiry are not on the same plane of discourse. Between the generalization of positive and normative studies there is a logical gulf fixed which no ingenuity can disguise and no juxtaposition in space or time bridge over."<sup>10</sup>

But, on the next page he states that, "All this is not to say that economists may not assume as postulates different judgments of value, and then on the assumption that these are valid enquire what judgment is to be passed upon particular proposals for action." Here, the economist seems to be dealing with valuations, for how could he otherwise assume them as postulates and apply them to actions? Nor is this the only way in which the economist "deals with" valuations. Robbins also states that economics "makes it possible for us to will with knowledge of what we are willing. It makes it possible for us to select a system of ends which are mutually consistent with each other,"<sup>11</sup> and that economics "enables us to see what sets of ends are compatible with each other and what are not, and upon what conditions such compatibility is dependent. And, indeed, it is just here that the possession of some such technique becomes quite indispensable if policy is to be rational."<sup>12</sup>

Robbins has presupposed the following: (1) Judgments of value may be assumed as postulates; (2) economists can deal with valuations; (3) it is possible to have a knowledge of what we are willing; (4) ends cannot only be known, but can be put into consistent or inconsistent systems; (5) sets of ends can be judged (and assumed to be judged cogitatively) to be compatible or incompatible with each other; (6) a technique for making sets of ends compatible is a prerequisite for rational policy making; and (7) policy can be rational.

If these presuppositions are accepted, it is difficult to understand why ethics and economics are not on the same plane of discourse. Nor is it possible to have a very clear idea of the presumed "logical gulf" which separates the two.

<sup>8</sup>If the place of reason in ethics is the same as the place of reason in science, and both use the same method of validation, it is difficult to see why anyone should insist on a dichotomy.

<sup>9</sup>Kenneth Boulding, *The Image*, The University of Michigan Press, Ann Arbor, Michigan, 1956, p. 11. "... although I shall argue that the process by which we obtain an image of values is not very different from the process whereby we obtain an image of fact, there is clearly a certain difference between them."

<sup>10</sup>Lionel Robbins, *Nature and Significance of Economic Science*, Macmillan & Co., Ltd., London, 1935, p. 148.

<sup>11</sup>*Ibid.*, p. 152.

<sup>12</sup>Robbins, *op. cit.*, p. 154.

Perhaps the philosophy which has come closest to the sort of consideration of value recommended here is that of pragmatism. The pragmatist has been more willing than the positivist to attempt the sort of dialectic of purposes which ethics amounts to. This sort of ethics is in the mainstream of American philosophy and is to be found in such writings as George Santayana's *Life of Reason*,<sup>13</sup> R. B. Perry's *General Theory of Value*,<sup>14</sup> and M. R. Cohen's *Reason and Nature*.<sup>15</sup> Using Dewey's pragmatism, however, one finds problems, for there are times when he loses the essential objectivity of both science and ethics in a kind of Wild-West Hegelianism. Dewey's philosophy "substitutes data for objects . . . . Objects are finalities; they are complete, finished . . . but data signify materials to serve; they are indications, evidence, signs, clues to and of something still to be reached; they are intermediate, not ultimate; means, not finalities."<sup>16,17</sup> But unless data are taken to signify something other than further data which signify still further data, it is hard to see how one makes his knowledge actually apply to a real world.

In ethics, Dewey holds that one cannot distinguish between ends and means. This is at best misleading. While it is true that the same action may be in one situation a means and in another situation an end, this does not mean that one cannot distinguish objectively between the two. One may argue that there is really no distinction between premises and conclusions because the same proposition may be a premise in one argument and a conclusion in another argument. Although this is true, it is nevertheless the case that premises and conclusions are different, and different in objective ways.

There is, however, a basic inconsistency in Dewey's thoughts on this topic, for often he writes as if the good were the satisfaction of social interests. This notion of goodness that is experimentally determined as the intelligent satisfaction of human needs and desires is never, to our knowledge, a mere means-end in Dewey's philosophy. Thus this utilitarian conception of goodness is incompatible with his means-end continuum. What makes pragmatism unsatisfactory here is its reluctance to take seriously the possibility of achieving knowledge of things as they are. In much of Dewey's writing the objective world seems to fade away into a metaphysical monadology of situations, and the would-be scientist sinks into a subjective morass without objective footing.

<sup>13</sup> George Santayana, *Life of Reason*, Charles Scribner's Sons, New York, 1954.

<sup>14</sup> R. B. Perry, *General Theory of Value*, Harvard University Press, Cambridge, Mass., 1950.

<sup>15</sup> M. R. Cohen, *Reason and Nature*, The Free Press of Glencoe, Illinois, 1953, revised edition.

<sup>16</sup> John Dewey, "The quest for certainty," reprinted in *Classical American Philosophers*, M. H. Fisch (ed.), Appleton-Century-Crofts, Inc., 1951, pp. 348f.

<sup>17</sup> The Wisconsin institutionalists are closely related to Dewey on this matter. See Kenneth H. Parsons, "The value problem in agricultural policy," *Agricultural Adjustment Problems in a Growing Economy*, Iowa State University Press, Ames, Iowa, 1958, pp. 285f. For a statement of the connection between John R. Commons and pragmatism, see Glenn L. Johnson, "Value problems in farm management," *Jour. Agr. Econ.*, June, 1960, p. 9. This same discussion points out a possible "identification" problem in the thinking of Dewey as reflected in the work of Parsons via Commons.



When one turns to the sort of analysis of value statements made by positivists, he finds at the basis of this discussion a failure to distinguish between ethical beliefs as such and attitudes held toward these beliefs. In any belief, one should be able to distinguish between the content of the belief and the attitude held toward this content. This is as true in ethics as it is in any descriptive science. The content of ethical beliefs are human purposes and interests. Such purposes and interests belong as much to the world of reality as the facts of chemistry, and the attitudes one has toward these interests and purposes should always be kept distinct from the purposes themselves. In terms of their essential naturalism, both pragmatism and positivism can be contrasted with Kantian formalism and intuitionism. However, pragmatists have been more willing than positivists to attempt the sort of dialectic of purposes which we have called ethics. On the other hand, the pragmatists have tended to lose the essential objectivity of both science and ethics, an objectivity basic for any knowledge.

### DISTINCTIONS

In addition to the assumption presented and supported above, two distinctions will also be maintained in the following paragraphs. These distinctions are (1) between normative science (descriptive and analytical) and moralizing and (2) between factual and normative beliefs on one hand and science and ethics on the other.

When one examines existing systems of values, it is possible to be quite objective in the examination and to avoid the sort of moralizing and preaching which has characterized so much writing in ethics. That it is possible to be objective (at least in the sense of objectivity presented here) while discussing values should be obvious from the preceding discussion, and it should be clear that it is not at all necessary to confuse exhortation with normative science and analytical moral philosophy.

The distinction between factual and normative beliefs is a distinction between two sorts of objective reality. Factual beliefs are directed toward matters of fact, or states of affairs; normative beliefs are directed toward things as they ought to be, or ought not to be. In recognition of this distinction, there have been those who would hold that science concerned with the former must be methodologically distinguished from ethics concerned with the latter. The thesis presented in this chapter is that science and ethics, while concerned with different subject matters, are not methodologically distinguishable.<sup>18</sup>

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<sup>18</sup> Kurt Baier, *The Moral Point of View: A Rational Basis of Ethics*, Cornell University Press, Ithaca, N. Y., 1958; Abraham Edel, *Ethical Judgment, The Use of Science in Ethics*, The Free Press of Glencoe, Illinois, 1955; Paul Edwards, *The Logic of Moral Discourse*, The Free Press of Glencoe, Illinois, 1955; Oliver A. Johnson, *Ethics, A Source Book*, Holt, Rinehart & Winston, Inc., New York, 1958; E. H. Madden, *The Structure of Scientific Thought*, Houghton Mifflin Company, Boston, Mass., 1960; Stephen E. Toulmin, *Reason in Ethics*, Cambridge University Press, New York, 1950.

The discussion thus far has furnished a vocabulary, some assumptions that appear reasonable, and has informed the reader about certain distinctions which will be important in that which is to follow. The next step is to tie the philosophic discussions presented above to the problem-solving processes of society by considering certain aspects of the history of farm credit in the United States.

## HISTORICAL SUMMARY

The history of farm credit problems and of steps taken to alleviate them furnishes some interesting examples of how values have been handled by society and agricultural economists. Solutions to past agricultural credit problems have ranged from (1) solutions based on the acceptance or rejection of alternative hypotheses about the nature of present or future reality, (2) through solutions obtained by changing reality to agree with "what ought to be," (3) to solutions based on choices among partially developed fact value concepts. Other interesting aspects of farm credit history in the United States include (1) the substantial role played by economists in the study of values as well as the study of facts in arriving at recommended "right" actions, (2) the few times, proportionately, that "explosive situations"<sup>19</sup> have arisen in connection with the work of agricultural economists on questions of value, and of right and wrong actions with respect to credit, and (3) the large number of generally acceptable policy decisions which have been reached on such credit problems.

Examples will be drawn from the period 1870 to 1960. The "Greenback movement" (1874) symbolizes a major agrarian revolt against the economic disadvantages of farmers. One of the major disadvantages involved their credit institutions. Values formed in this period continue to color thinking on farm credit problems.

Land credit became an important issue at the end of the 19th century. The Country Life Commission was created in 1908, and the Federal Farm Loan Board was established in 1916 — partly as an outgrowth of the work of that commission. Further legislation was enacted in 1923 when the Agricultural Credit Act was passed. The depression of the 1930's drew further attention to other shortcomings of our farm credit institutions. In 1933 the Farm Credit Act established the Farm Credit Administration with production as well as land credit services. The Farm Security Administration had evolved out of its predecessor agencies by 1939. It and its predecessor agencies experimented with different possible solutions to the credit and resource problems of farm people not serviced by commercial or other governmental credit agencies. Also, various credit institutions have been set up to alleviate financial problems arising from disasters such as drought, floods, etc. Credit facilities to service farm cooperatives were established in 1933. In

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<sup>19</sup> The Iowa oleomargarine case is an example of what is meant by an "explosive situation."

addition, the storage of surplus farm products has been financed in a variety of ways. The nature and adequacy of credit institutions are discussed in detail in Part III.

### Some Examples of Credit Problems Which Were Solved by "Getting the Facts"

Two subtypes of problems fall under this heading: First, there are problems of the form "if so and so ought to be, what is the best way of obtaining it," or "if so and so ought not to be, how is the best way to prevent it from being." Second, there are problems of the form "what or which best describes present or future reality." While many agricultural economists advocate that the work of agricultural economists should be restricted to answering questions of these two types, examples are difficult to find in the history of farm credit. And, those which are found are often of minor importance involving the operation of credit institutions to attain previously agreed upon goals or to carry out an action previously determined to be "right." Evidence of this may be found in Chapters 13 and 17.

Almost everyone has had experience with the techniques of belief formation by credit institutions in evaluating loans on real estate and durables. The beliefs which credit managers formulate about the condition of one's security, net worth, character (that is, one's system of values), earnings, and expenditures aid in solving the credit managers' problem as to whether or not to make a loan. (See, e.g., Chapter 25 and discussion by E. M. Norman.) Between such decisions and decisions on major policy questions is a continuum ranging from operational problems solved almost exclusively by obtaining answers to factual questions, through those involving answers to questions of policy in the initial absence of generally accepted answers to questions of value. Thus, the examples to be presented here are semi-operational in nature and do not involve major policy issues in farm credit.

At one time a farm credit problem arose for the Production Credit Associations (PCA's) and various cooperatives which were selling supplies and equipment to farmers. A substantial amount of production credit used by farmers is extended by farm supply houses. Overextensions of such credit often impaired PCA loans and produced financial troubles for farmers and farmers' supply cooperatives. It was agreed that it would be good to coordinate the extension of such credit and PCA loans. Note the objective nature of this consideration. The agreement did not simply amount to a group of people sharing the same attitude toward the world. The agreement was about the value of a world in which credit extension was coordinated with PCA loans. And the reality of such knowledge required no special value intuition. The question was one of predicting the outcome of various methods of bringing about this coordination. By 1960 at least two production credit districts had programs in effect for providing this coordination. One of these is known



as the reserve program; the other, as the guarantee program. In one instance, both the farmer and the cooperative provide a reserve against bad loans. In the other case, the cooperative guarantees the loan by co-signature. The first program is used most extensively in Michigan, but is proving only moderately workable. Consideration is being given to shifting to the guarantee program in order to increase workability.

### Some Examples of Credit Problems Involving Differences Between Partially Developed Concepts About "What Ought To Be" and "What Is or Can Be"

These examples are of two types: those involving independent ends and means, and those involving interdependent ends and means. Both types involve the process of forming beliefs about values and facts; however, interdependent means and ends do not necessarily involve interdependent fact and value concepts.

In writing about the Federal Land Bank system in 1955, Murray Benedict stated: "The individual lender cannot afford to buy a mortgage on a farm halfway across a continent, which he probably has never seen and whose owner he does not know. Even when he does know the farmer and his security, the risk of going wrong on a single farm is too great. As a consequence, loan funds have often been very inadequate in many rural, capital-deficit areas, even when savings accumulated in other sections of the country were seeking an outlet. It was to overcome this difficulty, and to provide an orderly and safe channel for the transfer of such funds, that the Federal Land Bank system was created."<sup>20</sup> If Benedict's statements were considered out of context, one might conclude that here was a simple case of solving a problem with factual concepts. Under this supposition, the necessary belief concepts would involve predictions about how the Federal Land Bank system would serve to channel credit from lenders to borrowers. Actually, however, both value and factual concepts had to be created and clarified over the 15- to 20-year period involved. Once developed, these value and factual concepts became the basis for the compromise represented by the Federal Farm Act of 1916 between the "goods" and "bads" involved in view of what was possible. While fact and value concepts were developed and systematized simultaneously, there is little direct evidence that the values of the ends and means were interrelated. In some instances the "bads" involved consisted of giving up some "goods" as dictated by the nature of reality as revealed by beliefs. While this process of giving up one good to attain another within available means does establish an exchange value between the two, this is quite different from interdependence between means and ends or facts and values.

The history of farm credit involves several studies of the facts with

<sup>20</sup> Murray R. Benedict, *Can We Solve the Farm Problem? — An Analysis of Federal Aid to Agriculture*, The Twentieth Century Fund, New York, 1955, p. 124.

the hope of helping to find the best means of attaining a previously agreed upon set of values. One such study was entitled Risk Problems of the Production Credit Associations.<sup>21</sup> This study was authorized by the members of the district Farm Credit Boards in 1950, and carried out by a committee of agricultural economists, general economists, and a research director, and included four heads of agricultural economics departments in land-grant colleges. The committee was to review and appraise. It reviewed, but limited its appraisal to "presenting for discussion and consideration certain methods of improving the ability of the PCA's to meet the risk inevitable in agricultural lending." The five methods included (1) strengthening PCA finances, (2) setting up a mutual loan insurance reserve, (3) setting up a group reserve for contingencies, (4) consolidation of production credit agencies of lending and discount, and (5) consolidation of the production (chattel) and mortgage (real estate) credit units of the Farm Credit Administration. This effort was discussed and supplemented with much informal study of the importance of spreading risks. Partially developed value concepts which had to be completed and clarified were also involved. These included the "goodness" of a self-supporting, independent link between borrowers and lenders. Congress passed the Farm Credit Act of 1956 upon the recommendation of the Federal Farm Credit Boards. This Act put method 4 into effect by providing for the merger of the Production Credit Corporation into the Federal Intermediate Credit Bank of each district. Numerous smaller steps have been taken to put method 1 into effect. Method 5 is still under discussion. Recently, representatives of the Farm Credit Administration approached agricultural economic researchers at Michigan State University with the request that they consider doing research on the advantages and disadvantages of a "one-stop credit program" to make coordinated production and mortgage credit available to farmers without separate visits to a Production Credit Association and a Federal Land Bank Association. Thus, method 5 may eventually be adopted. This idea was discussed previously by Diesslin in Chapter 13, Engberg in Chapter 15, and Tootell in Chapter 17.

The second type of problem involving differences between interdependent concepts about the values of means and ends is hard to illustrate. Consultation with members of the Michigan State University agricultural economics staff who have worked on credit problems failed to produce a clear-cut example of such problems. Similarly, an examination of a number of historical accounts dealing with agricultural credit problems and policies failed to produce clear-cut examples. The Wisconsin institutionalists who derived their ideas from John R. Commons hold that such problems are the type most generally encountered. Commons, in turn, based his ideas on the pragmatism of John Dewey and C. S. Pierce.<sup>22</sup> Our inability to illustrate the case which the Wisconsin

<sup>21</sup> F. F. Hill, William G. Murray, George H. Aull, R. J. Saulnier, E. L. Butz, and A. R. Gans, *Risk Problems of the Production Credit Association*, Preliminary draft for discussion purposes, subject to revision, December 31, 1950.

<sup>22</sup> Kenneth H. Parsons, "The value problem in agricultural policy," *Agricultural Adjust-*

institutionalists feel is most frequently encountered certainly raises questions about the generality of that case. However, this failure to find a clear-cut example of the kind of problem represented by the case should not indicate that the institutional point of view is without merit. The difficulty may be that the recorded history of the solution of agricultural credit problems is not detailed enough to reveal the interdependence by the value of means and ends held to be general by the Dewey pragmatists. Or, the difficulty may be that experiencing "what ought to be" and "what is or can be" simultaneously makes us believe that we cannot separate them in conceptualizing. The simultaneous occurrence of facts and values does not necessitate the interdependence of concepts of fact and concepts of value<sup>23</sup> any more than the simultaneous existence of shapes and colors makes it impossible to distinguish them intellectually.

### Some Examples of Conflicting Value Concepts in the History of Farm Credit Policy

The examples to be examined here come largely from the history of the Farmers Home Administration and its predecessor agencies, though there is at least one important problem of conflicting value concepts in the history of the Farm Credit Administration. The work of these two credit agencies are discussed in Chapters 11, 13, 14, and 17.

F. F. Hill, in carrying out the policies of W. I. Meyers, his administrative predecessor, felt that the Farm Credit Administration "ought to serve the credit needs of farmers" and "ought not to be used as a means of furthering other governmental programs." Secretary Wallace did not agree, and the Farm Credit Administration was placed in the U. S. Department of Agriculture. Hill and Wallace continued to disagree as to what ought to be. Hill was forced to resign in 1939, and A. G. Black was appointed to replace him. However, this agency was never really used as a means for carrying out the crop adjustment programs of the late 30's and early 40's largely as a result of the power possessed by the major farm organizations to back up the value position of those favoring a more independent credit agency. Wallace's value system, given the distribution of political, bureaucratic, and lobby powers, was less workable than Hill's. Hill's system stood the pragmatic test.<sup>24</sup>

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ment Problems in a Growing Economy, Heady, *et al.* (eds.), Iowa State University Press, Ames, Iowa, 1958. Some of the connections between pragmatism and institutionalism are found in J. R. Commons, *Institutional Economics — Its Place in Political Economy*, Macmillan & Co., Ltd., London, 1934, pp. 154-55 and 647.

<sup>23</sup> This contrasts with Boulding, *op. cit.*, p. 12, who writes, "One of the most important propositions of this theory is that the value scales of any individual or organization are, *perhaps* [italics added] the most important single element determining the effect of the messages it receives on its image of the world." We would more than emphasize the "perhaps"; instead, we would probably omit the sentence.

<sup>24</sup> M. R. Benedict, *op. cit.*, pp. 392f.



As indicated above, the Farm Security (later Farmers Home) Administration has encountered repeated problems of a value versus value nature.<sup>25</sup> The predecessor agency to the Farm Security Administration was the Resettlement Administration. It had grown up, in turn, out of the rural rehabilitation work of the Federal Emergency Relief Administration. This chain of agencies handled a whole series of problems defined by the dynamic, almost everchanging value and factual concepts held concerning rural poverty through the Great Depression, World War II, Korean, and postwar periods. Also, this chain of agencies has been experimental and has often been deeply involved in value systems which have failed to meet the criteria of consistency and clarity.<sup>26</sup>

The rehabilitation programs of these agencies have been criticized sharply for being too paternalistic, and for interfering with the freedom of individual farmers. Others have praised these programs for providing low interest credit to those whose incomes were unacceptably low, along with enough supervision and managerial "know-how" to raise incomes and insure repayment. Over the years, persons and agencies have come to attach less negative value to the increments of paternalism, subsidy, and restrictions on freedom in such credit programs, and have come to attach more positive value to increases in income and economic independence produced by such programs, while at the same time insisting that such programs be confined only to those needing substantial aid. It now appears that such programs will remain part of our governmental credit policy about as long as we have rural poverty arising from lack of control over enough resources to produce an acceptable standard of living.

Other value conflicts encountered by this chain of agencies have been settled by complete or partial abandonment of the values they pursued. Agricultural fundamentalists and others attached great value to farms, farmers, and farm life. At first these values led to resettlement activities designed to establish landless farmers and wage workers in permanent homes on the land. These efforts were often corporate, collective, and/or cooperative in nature. Soon, such resettlement became inconsistent with such widely held values as efficiency (which called for the transfer of people out of agriculture), the desirability of technological advance, and the desire to keep up with rising nonfarm levels of living. This called for larger more productive farms instead of subsistence farms, the desire on the part of the individuals involved to own and control their land and machinery, and a desire for freedom from group and governmental controls. With the passage of time, these competing values won out over the values attached to farms, farmers, and farm life as attainable through the Farm Security Administration resettlement activities. In 1946 the Farm Security Administration was replaced by the Farmers Home Administration which eliminated all community projects.

<sup>25</sup>*Ibid.*, pp. 356-64.

<sup>26</sup>*Ibid.*, p. 363.

In the case of the resettlement activities, the desire for more freedom to conduct individual affairs prevailed in conflict with some of the values included under agricultural fundamentalism and with other values. In the case of supervised subsidized credit for low-income farmers, this same desire for freedom to conduct individual affairs failed to prevail in competition with the value of income increments derivable from supervised and subsidized public credit.

Examination of the two cases makes it clear that in both instances compromises among the "goods" and "bads" were involved in determining the eventual course of action. Further, it is clear that it was not the totalities of freedom, all of the values of agricultural fundamentalism, or of all income which were balanced against each other. Instead, only the incremental changes involved in going from one course of action to another were weighed against each other. This balancing of incremental attainments and losses against each other in view of what is possible does not necessarily imply that the "goods" (ends, or what ought to be) against the "bads" (losses, or what ought not to be) are interdependent as argued by Dewey. To so argue would be the same as arguing that because iso-value product and iso-cost lines jointly determine the maximum profit point (which, incidentally, defines a "right" action) and establish the marginal value productivities at that point as the relevant values, the iso-value product lines (the structure of goods) are dependent on the iso-cost lines (the structure of bads or means). Alfred Marshall saw this much more clearly than John Dewey.<sup>27</sup>

### Social Scientists Have Played Major Roles in Studying Values as a Basis for Right Actions

The list of trained agricultural economists who have dealt with the values involved in credit problems is long and respectable. Of the seven Farm Credit Administration Governors to date, at least six are or were primarily agricultural economists. The list includes W. I. Meyers, F. F. Hill, A. G. Black, C. R. Arnold, I. W. Duggan, and R. B. Tootell, the present governor. Besides providing these governors, the agricultural economics profession has provided subordinate administrators, research workers, and appraisers to the Farm Credit Administration and other governmental credit agencies.

When one considers private agencies providing credit services to agriculture, the discipline is as well represented, e.g., the president of the Bank of America is an agricultural economist. Other agricultural economists serve in responsible positions in private credit institutions. Several agricultural economics departments regularly sponsor banker clinics with the express purpose of helping private banks service, and recognize opportunities for servicing, farmers. The Agricultural

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<sup>27</sup> Compare, for instance, John Dewey, "The continuum of ends-means," *Ethical Theories*, A. I. Melden (ed.), Prentice-Hall, Inc., New York, 1950, pp. 360f, with Alfred Marshall, *Principles of Economics*, 8th ed., Macmillan & Co., Ltd., London, p. 348.

Commission of the American Banker's Association has five advisors, at least four of whom are academic agricultural economists or farm management men.<sup>28</sup> Within the Federal Reserve system, most if not all of the district banks have competent agricultural economists on their staffs. Still further, agricultural economists from land-grant colleges and private universities serve as consultants to both private and public credit institutions. Members of Congress contemplating new farm credit legislation have been served repeatedly by agricultural economists from both state and privately endowed universities and colleges.

It is instructive to look at the Journal of Farm Economics for the 1931-36 period when credit problems were numerous and our credit institutions were in a state of flux. In this six-year period, 29 articles on farm credit, debts, mortgages, and related matters appeared in the Journal. Since the volumes were smaller in those days than the 1958 proceedings issue, a substantial proportion of the Journal's space was devoted to agricultural credit problems. These articles included (1) reports on the operation of the Federal Intermediate Credit Banks, the Federal Land Banks, and the Agricultural Credit Corporation; and (2) empirical information on mortgage debt, foreclosures, and farm debt adjustment.

In this period the writings of agricultural economists aided in the administration of the credit programs. In these articles, little attention was given to the restrictions of positivism, non-Pareto-better adjustments were not avoided, and the lack of interpersonally valid welfare measures were not mentioned. Agricultural economists were too busy amassing facts, developing value concepts, defining problems, ascertaining "right" actions, and executing those actions to let such restrictions limit their range of attack on the major credit issues of their day.<sup>29</sup>

#### Relatively Few "Explosive" Situations Have Arisen in Connection With the Work of Agricultural Economists on Values

While it is accurate to state that relatively few "explosive" situations have developed around agricultural economists working with the value aspects of credit problems, tensions and conflict have often been high in connection with operations of the FSA (FHA now), REA, and when the purposes of FCA have been questioned. In a few instances agricultural economists have "stood up to be counted" and then were beaten on value questions. The F. F. Hill-Wallace disagreement is a case in point. However, the history is mainly one of farm leaders, legislators, administrators (many of whom were agricultural economists), legal advisors, and agricultural economists doing an immense amount of homework on

<sup>28</sup>Agricultural Commission, Intermediate-Term Bank Credit for Farmers, 12 East 36 Street, New York 16, N. Y., inside front cover.

<sup>29</sup>The actions of these early fruitful workers' time were inconsistent with the positivistic restrictions present-day agricultural economists often impose on themselves.



fact and value concepts as a basis for right actions. The evidence in recorded history is that these often succeeded in developing value and fact concepts which were consistent and understandable. In those instances in which value tensions and conflicts did build up to critical levels, there is evidence of inconsistent value or belief structures, vague value and factual concepts, unacceptable values, or inaccurate factual beliefs. In many instances, this inconsistency, vagueness, and inapplicability was worked out before strong positions were developed. After these difficulties were eliminated, the strong positions which were developed usually led to solutions which have produced acceptable (right) actions rather than to explosions.

### A High Proportion of the Policy Decisions Reached on Credit Problems Have Been Satisfactory and Have Met the Criteria of Rationality (Logic, Clarity, and Applicability)

This symposium, with its purposes of defining credit problems and outlining research work (cf. Chapter 27), should not prevent one from recognizing that past work on credit problems has been good in the sense that applicable, understandable, and moderately consistent actions have been recommended and adopted. The solutions have been effective in that they have been expressed in terms of institutional arrangements which have, in turn, accomplished what public decision-making units have intended to accomplish. This record of success cannot be ignored by those of us who face the farm credit and capital problems of American agriculture in the 60's (cf. Parts I and II). As the general procedures followed in the past have accomplished results which speak well for the procedures, they are worth summarizing.

### General Procedures Followed in the Past:

1. Both factual and normative belief structures have been studied and developed by those persons (including agricultural economists) working on credit policies and programs for American agriculture.
2. Right actions have been ascertained as a compromise among the "goods" and "bads" within value structures in view of what was possible as revealed by factual beliefs about the nature of present and future reality.
3. Workers seem to have been able to avoid what Bentham feared when he wrote that attempts to work with values consist "in so many contrivances for avoiding the obligation of appealing to any external standard, and for prevailing upon" another to accept one's "sentiment or opinion as a reason in itself."
4. On many occasions, workers have had grave doubts about the reliability of their beliefs concerning the nature of present and future reality. Similarly, doubts appear to have been present concerning the clearness and consistency of value structures or normative beliefs. These doubts have led to humility on the part of legislators, administrators, and researchers; a humility which has led, in turn, to flexibility of opinion concerning the rightness or wrongness of different possible actions. There has been a willingness to experiment, re-examine, and reformulate. This flexibility and willingness (this recognition of a human tendency to err

with respect to both factual and value beliefs) has probably prevented individuals from taking positions not changeable except by socio-politic explosion.

5. Workers from the social science disciplines, particularly agricultural economics, have participated in all of the above-described procedures rather than confining their activities to particular areas such as those prescribed by (a) positivism, (b) conditional normativism (including modern welfare economics), and (c) "pure" normativism. There is little evidence that those who worked with values have suffered more professionally, or have been less productive, than those who have avoided the study of values. Rather, the reverse seems to be true.

6. Non-Pareto-better adjustments have been agreed upon and carried out repeatedly.<sup>30</sup>

7. Despite the difficulties encountered by many in conceiving of a "least common denominator of ability to attain more basic values which is neutral with respect to those more basic values," choices have been made repeatedly among alternative courses of action involving such divergent values as income, security, freedom from government control, equality of property ownership, equality in access to credit, and the rights of private property.

8. Increments and decrements in the degree to which valued situations are or would be attained have been frequently considered; complete attainment or abandonment of a value or set of values has seldom occurred.

9. Public actions have been determined by a rough sort of maximizing of the difference between "goods" and "bads," or of the ratio between "goods" and "bads." Thus, these actions would tend to be "right" as the term is used herein. This meaning of right is consistent with what the economist generally means by efficient so long as the concept of efficiency is left general and not restricted to mean the maximization of utility in the Benthamic sense.

## SUGGESTED PROCEDURES IN STUDYING CREDIT PROBLEMS

The analysis of values and the historical situations which have been examined suggest several methodological procedures.

1. In defining problems and making policy decisions about farm credit, it is important to recognize that two broad kinds of knowledge are important. Not only is it necessary to have factual beliefs of the sort gained by historical, economic, and sociological investigations, but it is also important to have knowledge of the personal and social values involved in the decision.

2. In acquiring this latter sort of knowledge, one cannot necessarily assume that decision-makers (legislators, administrators, voters, and customers) are aware of even their own personal values, not to mention less personal values which may be involved. Decisions are more likely to be right if based on carefully developed logical and clear values than on what people conceive the important interests to be in the early stages of problem perception and solution. In other words, the policy-maker must not assume that a description of initial values is a description of a generally acceptable value structure. The latter would be those values the people would express if they were in a position to know the sets of consistent and clear value concepts involved in a set of contemplated

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<sup>30</sup> An interesting connection between Kant's categorical imperative and modern welfare economics is pointed out by G. I. Trant, "Ethical systems and agricultural policy," *Canad. Jour. Agr. Econ.*, Vol. 7, 1959, pp. 75f.

social actions. Just as lawyers are consulted to determine legal interests because they know, and laymen do not know, the law which defines these interests, so is the organized research of economists, sociologists, and others needed to help develop value concepts.

3. It is recommended that the criteria of logical consistency and understandability (clarity) be used as criteria in formulating value, as well as factual, beliefs.

4. Just as it was recommended that logical consistency and understandability be used as criteria in formulating value and factual beliefs, so it is recommended that workability and efficiency be used as criteria in selecting "right" actions.

5. There is a need within the social disciplines for collaboration with philosophers whose chief concern is the meaning of crucial terms, as well as with those whose chief concern is empirical hypotheses and laws. Any branch of knowledge, theoretical or practical, can advance only as far as its basic concepts allow it to advance. One wonders whether, for example, agricultural fundamentalists always have a clear understanding of the nature of the value system they advocate. Often one has the impression that the high value given to the family farm is unrealistic in view of the facts, and that a clearer understanding of the actual value of such an institution would change their point of view.

6. In attempting to understand problems of credit as they relate to farmers, it is important to consider the historical, economic, sociological, and moral contexts within which these problems occur. Much is to be said for very close participation in the work of the decision-making units encountering the problems. Though such participation is sometimes regarded as interfering with objectivity, it must also be recognized that such participation may be the only source of experience with the complex, interrelated values involved in many problems.

7. While we have been unable to reject any commonly advocated approach to the study of facts and values as having been useless in the solution of credit problems, we have also been unable to find any single approach capable of accomplishing all that the others have accomplished.<sup>31</sup>

8. In determining right actions on the basis of (a) the "goods" and "bads" involved in a problem and (b) what is possible, it is recommended that the maximizing procedure of economists be used extensively. Right actions and efficiency are very closely related concepts.

9. In using the maximizing procedures of economists, it is recommended that no distinctions be attempted between economic and noneconomic values, or between economic and noneconomic efficiency, or between economic and noneconomic "right actions."<sup>32</sup>

10. It is a mistake to omit the pragmatic (workability) dimension

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<sup>31</sup> F. H. Knight, *On the History and Method of Economics*, The University of Chicago Press, Chicago, Ill., 1956.

<sup>32</sup> Glenn Johnson and Joel Smith, "Social costs of agricultural adjustment — with particular emphasis on labor mobility," *Problems and Policies of American Agriculture*, Iowa State University Press, Ames, Iowa, 1959, p. 259.



when formulating credit policies. No matter how clearly understood or how factually wise and normatively adequate policies may be, if they do not actually solve the problems for which they were created, they are of no value.

11. Because of the high probability of developing false beliefs (both factual and normative), humility is in order with respect to both value and factual concepts developed in the study of credit problems. Humility is demanded by the values of science, most religions, and of society in general, and is generally an imperative.

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## *Sociological and Social Psychological Factors*

CREDIT IS USED in the nonagricultural business world as an integral part of the over-all business operation. Business people, in general, consider credit as another economic resource available to them in the routine operation of their business affairs. There is some evidence, however, that this generalization does not necessarily apply to farmers as a group to the same degree that it does to businessmen.

Some of the factors which influence farmers to think differently about credit are examined in this chapter. In addition, some research evidence will be presented about how farm people think and feel about credit and the use of credit in purchasing goods and services.

Economists frequently refer to some of the factors limiting credit use within the dichotomous framework of internal and external capital rationing (e.g., Chapters 1, 2, 7, and especially the discussion by Coutu and Lindsey in Chapter 21). Some of the sociological and social psychological factors related to internal capital rationing will be examined below. Internal capital rationing involves self-imposed limitations on capital and credit use on the part of the person involved. It is the contention here that to understand the phenomenon of internal capital rationing, one must have some insight into the "self" which is involved in the imposition of these limits on capital and credit use.

In order to present the data relating to personality structure which may affect credit and capital use, a previously developed framework is used which has general application wherever individual action and decision-making is under analysis.<sup>1</sup> Throughout this paper certain concepts and definitions will be used that may vary slightly from the way in which they are used in economic writings. These terms are defined below:

A concept is a semantic symbolization of the relationship which is purported to exist between any two or more given phenomena.

A belief is a subjective interpretation of a concept.

A value is a subjective interpretation of the relationship which *ought* to exist between phenomena. Sometimes values are referred to as normative beliefs.

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<sup>1</sup>Instructor's Guide: Communication Training Program, Unit 1 — Basic Communication, Section 3, The Group Process. Developed by the National Project in Agricultural Communications from an original manuscript prepared by Joe M. Bohlen and George M. Beal. Copyrighted 1956 by the American Association of Land-Grant Colleges and State Universities.

An attitude is an individual's tendency to act based upon his beliefs and values.

A goal is a future relationship which an individual wishes to establish between himself and certain selected phenomena.

Means are courses of actions which may be taken to achieve goals.

Reality is that part of the relationships which exist between phenomena that are similarly perceived by different individuals in different places and/or at different times. For a given individual, the interpretation of the relationship between phenomena is a composite of reality and beliefs. If a person believes a relationship to exist between phenomena, insofar as his subsequent behavior is concerned, it does exist (cf. Johnson and Zerby's approach in Chapter 21). It is because of the truistic nature of this statement that it becomes necessary to understand the process of how man thinks, if his use of credit is to be fully understood.

## MAN, THE THINKING BEING<sup>2</sup>

Man is born into the world with certain potentialities which have been biologically determined (intelligence parameter, physical size, resistance or susceptibility to certain bodily ills, etc.). He is also born with a predisposition to act, or to sustain physical movement. Because of the unique nature of his intelligence, he is inclined to place all the phenomena which he perceives into patterns of meaningful interrelationships. Man is an organizing being. He organizes the world around him into patterns of cause and effect which to him are rational. In many instances he does this without taking into consideration all of the data that are known or are possible to know. Hence, he sometimes assigns relationships to phenomena which are spurious, from the point of view of scientific fact.

Man is able to go through the process of perceiving interrelationships because he has the ability to deal with abstractions. He can create symbols in his mind which have empirical referents in the universe about him. This frees him of the necessity of being in immediate sensory contact with phenomena in order to respond to them or act in relationship to them — a faculty unique to man.

Because man has this ability to deal with abstractions and communicate via exchange of symbols with meanings, he has another uniqueness. Man is the only form of life which is faced with the necessity of making a distinction between those things which are real and those which are possible. All of the life forms below him must have sensory experience with "real" things in order to respond to them. There is no intellectually perceived future for any life form which cannot use symbols in its mental operation. Possibilities are always in the frame of reference to the future. Since all life forms except man respond directly to stimuli, their behavior is much more easily predicted than that of

<sup>2</sup> For further elaboration of the ideas presented in this section, see Ashley Montagu, *Human Heredity*, The World Publishing Co., Cleveland, Ohio, 1959; George H. Mead, *Mind, Self, and Society*, University of Chicago Press, Chicago, Ill., 1947; John Dewey, *Human Nature and Conduct*, Holt, Rinehart & Winston, Inc., New York, 1922; Ernst Cassirer, *An Essay on Man*, Yale University Press, New Haven, Conn., 1944.



man. They respond in what is called the simple reflex arc, i.e., a direct response to a stimulus.

Man never responds to a stimulus per se. Whenever a human being is faced with a stimulus or problem, he responds not to it, but to the interpretation which he places upon it. He deals not only with the realities of the situation, but with the possibilities of it. Since he can deal in symbols, he can project himself into the future and mentally create alternative courses of action which he can evaluate and then make choices from this evaluation.

### The Unit Act

In order to discuss the above more concretely, it is necessary to move to the lowest common denominator of human behavior, that which will be operationally called "The Unit Act." The unit act consists of (1) the receipt of a stimulus, (2) the interpretation of this stimulus and the circumstances under which it was received, and (3) a response or an action. In contrast to the simple reflex arc described above, man thinks in terms of a stimulus which leads to interpretation and then results in a response. The response may be to do nothing, or not to act overtly in relation to the stimulus. This is an act in itself.

Before man responds to any stimulus toward which he has not developed a habituated pattern of behavior, he weighs alternative goal choices in terms of the kind of outcome he prefers, and selects a means for attaining the choice he makes. This is referred to here as a part of the interpretation process.

A more detailed discussion of the unit act is appropriate at this point. Whenever man receives a stimulus, he looks into his past experiences and asks himself what similar stimuli he has received or what similar problems he has encountered. In fact, it is doubtful that man will receive the stimulus unless he has had past experience with it, or a similar experience. Next, he asks himself how he had responded or acted in relation to these similar stimuli when he had encountered them in the past. This would apply to both ends and means. He recalls his evaluation of his actions, and whether he was satisfied or dissatisfied with the outcome of his actions.

Man relates his past to the future by asking himself if he wants the same outcomes or goals now as he did when he responded to the similar stimuli in the past. If not, what different goal(s) does he want to attain or consider? He projects to the future to determine if the same alternative means that were open to him in the past are still available. Are there more efficacious means now available? Only after he has considered his relevant past experiences and his projections of the future does he choose an alternative (end and mean) which best suits his values.

## Role of Stimuli

The personality of man is molded by the series of events which are a part of his experience world. When he receives a similar stimulus repeatedly and each time responds in a similar manner which gives him satisfaction, the interpretation moves from the intricate level discussed above to a cursory recognition that the stimulus is a familiar one. When this takes place, an individual has formed a "habit" — a convention by which he copes with relatively similar and familiar stimuli with a minimum of intellectual effort. This allows an individual to do many routine things very quickly, and to utilize time for interpretation of new or relatively unique stimuli. When an individual develops a habitual way of dealing with a recurrent stimulus or pattern of stimuli, he frequently neglects to note that at each recurrence the stimulus and/or circumstances surrounding it have changed slightly so that over a period of time he is responding to a stimulus pattern that has been so altered from the original that his habituated response is completely nonrational.

Because man can deal with symbols which have empirical referents without being within sensory proximity of these referents, his experience world consists of not only those experiences in which he was an active participant, but also the experiences of other men which took place at other times and in other places. To the scholar who makes the most of this, the accrued experiences of all civilized mankind are available for use in making decisions. Since most of these accrued learnings are in the form of the written word, the semi-literate or illiterate have available to them only those experiences in which they have personally participated or of which they have heard.

However, each man builds up his experience world and makes judgments about each of these experiences as he has them. He evaluates them in terms of the relative satisfactions gained. He judges them to be good, bad, or indifferent. The patterning of these judgments about past experiences forms what is known as an individual's value system. The individual's value system provides him with a set of tendencies to act in relation to stimuli which he receives. These tendencies to act are commonly referred to as attitudes. Since man is not a Univac, he often holds conflicting attitudes without any seriously deleterious mental consequences. In many cases man segments his attitude structure — he acts rationally within a given segment of his attitude structure, but the action may be in competition or conflict with another segment of his attitude structure. In some cases man has a poorly integrated total attitude structure. As man receives a stimulus and contemplates his response to it, he takes into consideration both the ends or outcomes which he most favors and the means or methods of attainment which are most acceptable to him.

Part of man's value system is the tendency to organize both ends and means into more or less organized hierarchies on the basis of favorableness and acceptability to himself as an individual. He may

place these in juxtaposition when making his choices of alternatives. In this process, a lower level or less favorable goal may be selected because the means of attaining the more favorable goal was too unsatisfactory to accept. When a given goal exists with alternative means of attaining it, man inevitably (unless he is mentally ill) chooses the means which he considers most satisfactory for himself. But, of course, the amount of knowledge, as well as values and attitudes, will determine even the alternatives considered in making decisions.

At any point in time when an individual who is farming faces the problem of attaining a certain economic goal, he must (because he is a human being) go through the processes described above. When he considers or interprets the situation, he brings to bear his value system and the resultant attitudes he has toward credit use — frequently referred to by him as “going in debt” (which is an insight in itself) — and all of the past experiences he has had with credit use. The experiences which are known through active personal involvement or by vicarious means may be very limited, but limited or not, these provide the framework out of which the farm manager projects the alternatives which are considered to be available to him (cf. Chapters 14 and 21 for application to economic situations).

### Values and Attitudes

Within this basic context of how man thinks, there are many specific concepts from the fields of sociology and social psychology that are of value in better understanding how man forms and acts in relation to his value system. Several concepts are presented here for illustration of this point.<sup>3</sup>

Attitudes flow from a value system which is built up from accretion of judgments made about past experiences. Man's world tends to become meaningful and organized in part through repetition of experiences with the same outcomes. After similar experiences with the same concept again and again, the individual comes to expect the same results. He perceives those parts of present experiences that resemble the past. This is known as selective perception. This often leads to canalization. The range of potential actions that are perceived to be satisfactory becomes more and more narrow. It is found in advertising research that individuals are far more amenable to having their existing needs implemented than they are to developing entirely new needs. Advertising (and education?) is typically directed toward the canalizing of preexisting behavior patterns or attitudes.

The first perceptual contact and reaction to a new stimulus (primacy) is often deeply embedded in the value structure — in a sense it is

<sup>3</sup> For additional clarification of the concepts, see Eugene H. Hartley and Ruth E. Hartley, *Fundamentals of Social Psychology*, Alfred A. Knopf, Inc., New York, 1955, pp. 233-49; Wilbur Schramm, *Process and Effects of Mass Communication*, University of Illinois Press, Urbana, Ill., 1955, pp. 289-320.



integrated into the value structure, and once there, must be "dislodged" if a change is brought about in attitude. The recency of experience seems to be important, since there appears to be less distortion in recall of the experience and the judgment made of the experience if the experience were recent. Another factor that is important in embedding an experience in the value structure is the intensity of the experience. Thus, an experience dealing with credit that is perceived as a crisis with much emotional involvement may lead to an embedding of an attitude toward credit that will be difficult to change. Another social-psychological concept that may have importance in the study of attitudes toward farm use of credit is "transfer." It has been found that a given response originally aroused by one stimulus can in time be aroused by a large number of other stimuli which may bear little resemblance to the original stimulus, but which are connected to it by association in time or space, or in some other way in the individual's experience field. Thus, one early bad experience with a particular borrowing of money can be transferred to all forms of credit by association.

Any given attitude held by an individual has four major dimensions:<sup>4</sup>

Direction — for or against, positive or negative, support or rejection of a given concept or stimulus — person, group, process, institution, issue, etc.

Degree — variation in direction; for example, very favorable, favorable, about 50-50, unfavorable, very unfavorable.

Intensity — degree of conviction with which an attitude is held.

Salience — position of specific attitude within individual's constellation or structure of attitudes — central, core, basic, or peripheral.

Man acts partially in terms of his referents and reference groups. These are the groups with whose norms he believes he should comply (usually groups of which he is a member) or those with whom he compares himself. Thus, in making decisions regarding credit he may ask himself if this type of credit or amount of credit is within the expectation of the group for its members. Or, if he aspires to be "like" or be accepted as a member of a given reference group, he asks himself if a given type of credit behavior is acceptable in those groups. Likewise, man thinks in terms of individual referents. A given farmer may not seek a given type of credit from an important referent, e.g., a banker, because of his perception of a negative attitude by the banker. In this case, the banker is a significant other to him. The broad framework of how man thinks and acts, as well as the specific concepts, some of which were given above, appears to be a valuable analytical tool in studying the nature of credit use by farmers. The major problem is setting up general theory models and workable concepts for empirical hypothesis testing. The above given framework and sociological and social-psychological concepts have been of great value in attitudinal research. Since very little of this type of research by the authors has

<sup>4</sup> Additional discussion may be found in Hartley and Hartley, *op. cit.*, pp. 665-74.

dealt with credit per se, most of the concepts are not directly applied to the use of credit in this chapter. However, a number of findings that may be logically related to credit use by farmers are presented below. In addition, selected findings from studies related to credit use conducted by other research workers are utilized in the following discussion.

One of the problems in doing research in the area of values and attitudes is stating precisely the level of the attitudes being measured. In Chapter 19, Johnson and Zerby present their definitions of instrumental values (a concept of what ought to be, where the "ought" is derived from a more basic value) and basic values (a more basic value for which instrumental values are actualized).

It is not inconsistent with this conceptualization to speak of values on a continuum from general to specific. For instance, farmers' attitudes toward the role of science in farming may be conceptualized as being at an intermediate level of generality. Below this level of generality one might expect to find many more specific values and attitudes toward the use of science in specific aspects of farming. The farmer who has a high-level orientation toward science in farming might be expected to believe that the use of scientific information and methods in farming is a necessity. This type of farmer would be rational in his decision-making process, i.e., seeking out all available scientific information, considering all alternative available inputs. He would be more ends oriented than means oriented. One might infer that this type of farmer would most likely consider the optimum use of credit as a means to an end.

The Iowa State University rural sociology team has developed a scale that attempts to measure this attitudinal pattern orientation toward the use of science in agriculture. Starting with 42 items, this scale has been reduced to 6 items with a Guttman coefficient of reproducibility of 0.91.

The attitude toward scientific agriculture correlates significantly with such items as: education, farm size, extra-locality orientation, categories of agricultural chemicals used, agricultural chemical expenditures, expenditures for fertilizer, perceived importance of fertilizer to farm income, fertilizer knowledge and risk preference (willingness to take risk). Limited analysis indicates that a number of specific attitudes and actions can be at least partially predicted by this general attitudinal pattern toward the importance of science in agriculture.

As the farmer faces the problem of making and carrying out decisions, he is confronted with risk and uncertainty. He has a general attitude toward risk-taking. Within this general attitude framework, the farmer has specific attitudes toward certain ends and means available to him, including attitudes toward credit.

A 10-item risk preference scale has been developed and used in field research. The most negative attitude toward risk would have scored 10, and the most positive attitude would have scored 50. The

scores actually ranged from 16 to 41, with an average for the Iowa statewide sample amounting to 27.2. The greatest concentration of scores was near the lowest end of the scale, viz., greatest aversion to risk.

The research worker is faced with a dilemma when he attempts to impute causality to relationships found between risk-taking and credit use, and other factors. Certain variables are found to be significantly related and have predictive qualities. There may be logically hypothesized causal relationships. Cause and effect are difficult to establish quantitatively. However, from the point of view of action orientation, certain cause and effect relationships are often assumed and, in fact, must be assumed in information and education programs. It often appears that changing one variable often brings about a change in another variable. Because of the great number of intervening and related variables that may be involved in the change process, it is often difficult or impossible to attach direct causality or at best to determine the actual degree of causality of a single variable. However, a number of significant relationships are found between risk preference and other variables.

The size of the farm operation, as measured by number of crop acres, has a significant positive relationship to risk preference (willingness to take risk as measured by the risk preference scale). It is difficult to construct a logic of causality between these two variables. It may be hypothesized indirectly that the farmer has a larger number of crop acres because he has been willing to take some risks. Conversely, it might be hypothesized that the larger equity in the form of land makes it more tenable for him to take risks because he has a larger equity from which to operate. There may well be an interaction between these variables. A similar argument may be made in relation to the highly significant positive relationship between gross income and risk preference. A significant difference of risk preference is also found among renters, renter-owners, and owners. Renters have a higher risk preference score.

### Risk Preference and Other Attitudinal Variables

There are significant interrelationships between risk preference and other attitudinal variables. There is a significant positive relationship between willingness to take risks and the attitudes of farmers toward the importance of science and modern technology in present-day farming. There are also significant positive relationships between risk preference and how important a farmer thinks the use of fertilizer and other agricultural chemicals is in achieving a desired level of farm income.

Other inferences can be drawn from the highly positive significant relationships between positive attitudes toward taking risks and the actual expenditures for fertilizer and agricultural chemicals. The fact



that farmers have a "self image" of themselves in relation to other farmers as far as willingness to take risks is shown by an individual item analysis. The following is one of the items in the scale, and responses made to it:

I regard myself as the kind of person who is willing to take a few more risks than the average farmer.

Strongly agree	5%
Agree	33%
Undecided	12%
Disagree	47%
Strongly disagree	3%

The majority of those who gave direct answers (either agree or disagree) believed they were less willing to take risks than the average farmer. It may be hypothesized that these answers represent the effect of reference groups on credit use.

Insight may be gained into attitudes toward risk by the answers obtained to the following statement:

A reliable criticism of many farmers these days is that they have forgotten how to play it safe.

Strongly agree	5%
Agree	50%
Undecided	12%
Disagree	31%
Strongly disagree	2%

This question allowed each respondent to set his own framework of what it means to "play it safe." It may be noted that the majority of farmers (55 percent) agreed that many farmers have forgotten how to play it safe. On the other hand, 33 percent disagreed with the statement. The remaining 12 percent were undecided. Thus, one might infer that there are a majority of farmers who think many farmers of today are too willing to take risks, viz., a negative attitude toward taking risks. An additional measure was attempted on the perception of how far farmers must sometimes go in taking risks.

The statement: If a farmer is to get ahead in life, sometimes he must be willing to gamble on all or nothing at all.

Strongly agree	6%
Agree	30%
Undecided	7%
Disagree	44%
Strongly disagree	13%

That new modern technology is perceived as being an important risk and uncertainty factor in present-day farming is indicated in the following data:

There is a large amount of risk or uncertainty that goes along with the results from the use of any new farming technique.

Strongly agree	6%
Agree	64%
Undecided	7%
Disagree	22%
Strongly disagree	1%

Since use of credit involves either a risk or an uncertainty, depending upon the type of use and level of knowledge of the individual, an examination of farmers' attitudes toward risk-taking may provide some insight regarding the existing use patterns. A study of a group of 120 farmers in south central Iowa revealed that 70 percent of the respondents had an aversion to risk-taking as indicated by their responses to a hypothetical situation.<sup>5</sup>

The respondents were asked, "If you had the choice of making \$1,000 now or the possibility of making either \$500 or \$1,500 in the future, which choice would you take?" Over 70 percent chose the \$1,000. There were highly significant relationships between the choices and the respondents' knowledge of fertilizer and fertilizer use, as well as the amounts of fertilizer used. Those who "played it safe" knew less and used less. In another phase of this TVA cooperative research study, the results of data secured from a sample of 315 farmers indicated that willingness to take risks was positively correlated to their attitudes toward scientific agriculture, their attitudes toward the importance of fertilizer use, and their attitudes toward the risks involved in farming. Also, their willingness to take risks was related to amounts and expenditures for both fertilizer and agricultural chemicals.

A second item regarding credit was also included in this study:

A farmer can borrow \$500 to purchase a new piece of farm equipment that can make him an average profit within the year; he should borrow the money.

Strongly agree	10%
Agree	72%
Undecided	11%
Disagree	6%
Strongly disagree	1%

Within a farmer's general attitude pattern toward risk-taking, he has an attitude toward credit, and even more specifically, differential attitudes toward credit for different purposes. The fact that there may be a favorable attitude toward credit for farm machinery is suggested

<sup>5</sup>Joe M. Bohlen, George M. Beal, and Larry Campbell, Analysis of Some Characteristics of Individuals Using Soil Testing as the Result of a Promotional Program, Rural Sociology Report No. 9, Aug., 1959. Cooperative project with Tennessee Valley Authority, ISU Agr. Exp. Sta. Project 1352. This research was conducted under TVA Project Authorization 1096.

in the above findings. Bivens found that 25 percent of a central Iowa sample of farmers who were using production credit were using credit for farm machinery and equipment.<sup>6</sup> Venezian found that those farmers who had a high willingness to assume risk (willingness is based on scores from a scale which had been developed to indicate high, medium, and low willingness to assume risk) were the ones who actually had the most credit outstanding.<sup>7</sup>

Bivens also found that the general attitudes toward debt contained a high degree of risk aversion. He used a series of statements to which his respondents could react on a 5-point continuum ranging from definitely agreeing to definitely disagreeing with the statements. Some of the basic values which provide the background of the attitudes toward credit are obvious in the range of replies to these statements. One statement was, "It is desirable for every farm family to get out of debt as soon as possible." Almost 90 percent of the respondents "definitely agreed" with the statement, and another 9 percent "agreed somewhat" with it. Only 1 percent "disagreed somewhat" with it. This type of response implies a basic fear of being in debt which may limit an economical use of credit as a management resource.

Previous work by the authors and others has indicated that there is a significant negative relationship between high value on land ownership and willingness to take risks of another type, i.e., adoption of new farm practices. Bivens found that there were strong attitudes toward land ownership in his sample of farmers. This finding is consistent with practically every other research study that has attempted to measure this attitude.<sup>8</sup>

Some of the data, as yet unpublished, from the research project used by Venezian for his thesis provide further insight into this attitudinal structure.<sup>9</sup> One of the statements to which the respondents could react as stated above was, "Farm families would do well to wait until they have accumulated their own money rather than borrow money for farm production purposes."

As pointed out earlier in this chapter, individuals consider the ends and choose the means in relation to themselves. The evidence in the area of credit and credit use supports the hypothesis that if an end is desirable enough, an individual will use a means which may be disliked to attain it. Thus, the type of goal which would be accomplished by the use of credit might temper its use. In Venezian's study, an effort was made to get a ranking of farmers' goals. He found that the most frequently mentioned goals of farm people were closely oriented to the farm itself, and to security.<sup>10</sup>

<sup>6</sup> Gordon E. Bivens, "From household interdependence and other factors in relation to use of credit by farm families in Greene County, Iowa." Unpublished Ph.D. thesis, Iowa State University, Ames, Iowa, 1957.

<sup>7</sup> Eduardo L. Venezian, "Use of production credit by farm families." Unpublished M.S. thesis, Iowa State University, Ames, Iowa, 1959.

<sup>8</sup> Bivens, *op. cit.*

<sup>9</sup> ISU Agr. Exp. Sta. Project 1349.

<sup>10</sup> Venezian, *op. cit.*, p. 54.



Sometimes an individual finds the only means of attaining a goal so unacceptable that he will substitute a lesser goal. The evidence that a large proportion of the farmers in Bivens's study thought it was better to buy a smaller farm and have less debt is a reflection of this phenomenon. It may be that some of the part-time farming that is rapidly increasing may be of the same nature. Some of these farmers prefer to supplement their incomes with off-farm jobs rather than assume the risk of borrowing to increase their farm size to a more nearly optimum unit.

Production credit is used next to most frequently, and consumer credit is used least frequently. Bivens found that there was a difference in the use of credit by specific production items.<sup>11</sup> Over 41 percent were using credit to purchase oil and gas, 34 percent to purchase feed, 30 percent to purchase livestock, 26 percent to purchase seed, 25 percent for equipment maintenance, 22 percent for new machinery, and only 17 percent for fertilizer and lime. Only two items of farm production had lower credit use than fertilizer: repair on buildings, 5 percent; and fencing and tiling, 2 percent. This differential use within categories was also found in the area of consumer credit.

Individuals often hold conflicting values which they do not recognize. Some results of research in values indicate that once a basic value system is determined, it is very difficult — if not impossible — to change that value structure. The most that can be hoped for is to suppress a value in rational decision-making. It is also a well-known fact that one of the difficulties in measuring values and attitudes is that people often have "private" and "public" value and attitude systems. They may be quite conscious that their values do not conform to the generally accepted norm, and in overt expression through statements or actions they attempt to purvey the "publicly" accepted value.

Past research has demonstrated that various attitudinal concepts can be operationalized, measured empirically, and relationships determined. Only limited research has studied the use of credit as the dependent variable. However, the limited evidence presented leads one to conclude that the study of the use of credit using sociological and social-psychological theory, concepts, and methodology should be a fruitful area of research that could give some significant answers to questions involving the "why" of the use or lack of use of credit by farmers.

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<sup>11</sup> Bivens, *op. cit.*

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## *Farmers' Attitudes Toward Credit and Capital<sup>1</sup>*

IN THIS CHAPTER the attitudes of low-income farmers toward credit will be of primary interest, but the attitudes of farmers in other income categories will be considered (cf. discussion by Bohlen and Beal in Chapter 20). Credit will be regarded as an important and powerful phase of economic policy; and, although emphasis will be upon attitudes, it will be assumed that attitudes toward credit policy cannot be considered in isolation from the policy itself.

The objectives of this chapter are as follows: (1) to present a concept of credit and to relate this concept to the attitudes of farmers; (2) to characterize in some detail farmers' attitudes toward credit under existing policy; and (3) to suggest how the attitudes of farmers toward credit can be altered by changes in credit policy.

### CREDIT AND THE POLICY ISSUES

Credit is viewed to be essentially a power concept. In the process of borrowing money, a farmer obtains the economic power to carry out a particular course of action, however limited it may be. Although credit may be expressed in monetary terms, this power to effect action or change is of major concern here.

A credit system may exert a powerful influence upon the rate that agricultural firms and areas reorganize in the wake of technological and related economic forces. Credit is a joint affair; the borrower and the lender decide together, implicitly or explicitly, upon the nature and scope of the action which credit makes possible. Through security requirements and repayment terms, they also decide upon the nature and extent of the relationship between them. Because of this close relationship, credit institutions are of strategic importance in considering the attitudes of farmers toward change. A relevant question is whether in the design of general agricultural policy sufficient attention is being given to the policies of these institutions. The thesis presented in this chapter is that essential changes in the economic organization of agriculture can be

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<sup>1</sup> Approved by the Director of Research of the North Carolina Agricultural Experiment Station as paper No. 1158 of the journal series. The authors are indebted to James G. Maddox and W. D. Toussaint for their constructive criticisms and suggestions.

greatly accelerated, particularly in critically low-income areas of the South, by strengthening the role of credit institutions.<sup>2</sup>

Essential changes in organization involve the transfer of human and physical resources between agriculture and the nonagricultural sector, and the regrouping of resources within agriculture. They also involve the learning processes of individuals, both those who remain in agriculture and those who transfer to other activities. Through appropriate modifications in credit policy, alternatives open to farmers may be altered so that they would prefer to make adjustments at the rate and to the extent necessary to bring income levels up to a par with those prevailing in nonfarm sectors of the economy. In short, modification of credit policy, in conjunction with other phases of policy, is necessary in dealing effectively with the attitudes of farmers toward credit and capital.

### FARMERS' ATTITUDES

Attitudes of farmers toward credit are reflected in their decisions which may govern the influence that a credit institution may exert upon the internal operation of the farm business. Attitudes toward credit represent just one aspect of the decisions which a farmer makes that define the scope of his activity, and thus characterize who he is and what he does. These decisions are concerned with such matters as personal judgments with respect to his own abilities, the choice of resources over which control may be secured, and opinions pertaining to the individuals, firms, and institutions that make up the environment in which he exists. Within the limits established by these broad decisions, a farmer makes lesser decisions with respect to what to produce, when to sell, the use of his leisure time, choice of consumption items, and many others. Interest here is in the broader attitudes of the operator which govern, on the one hand, the extent to which the external environment shall influence the internal operation of the farm, and on the other hand, the nature and internal strength of the decision-making unit.

At any point in time, the attitudes held by a farmer may lead either to the growth or deterioration of his farm business. The environment external to the farm is constantly changing under conditions of technological advance, population growth, and rising per capita income. Unless the operator keeps pace with events beyond his control, his problems become analogous to those of the private within a platoon of marching men. If the private slows his pace to less than the given cadence, he

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<sup>2</sup>The ideas expressed in this chapter are based largely upon the experience of the authors in working closely with farm families in North Carolina. This experience is reviewed in A. J. Coutu, E. L. Baum, and R. M. Ray, *An Analysis of the Parker Branch Watershed Project 1953 Through 1959: A Progress Report*, T60-3AE, N. C. State College and Tennessee Valley Authority Cooperating, Knoxville, Tenn., 1960; and Quentin W. Lindsey, *Transforming Low Income Farms into Profitable Commercial Farms and Financing the Development of Commercial Farms*, Department of Agricultural Economics A. E. Info. Series Nos., 76 and 77, N. C. State College, Raleigh, N. C., 1960.



must minimize the onslaught of trampling feet behind him; if he quickens his pace, he must trample over those in front. He can force the platoon to follow his choice of cadence only if he possesses great strength.

The role of the farm operator in the economic community in which he exists is at once more complex and less rigorously defined than that of the army private. It varies with the operator's tenure status, age, health, and education, and with the size and type of farm. It also varies with the economic conditions of his community. But regardless of the setting, the farmer's attitudes coordinate his pace with the cadence of events about him.

### Aversion to Change

If a farmer has fallen behind the general pace of economic events, his business is likely to be in a state of relative, if not absolute, decline. Two choices are open to such a farmer, viz., (1) he may seek to regain a position within the bounds of successful business enterprise, in which case a burst of energy will be required; or (2) he may choose to prolong his existence as a going concern by shrinking within a shell of partial economic isolation because the required energy may be beyond his capacity. If he chooses the latter approach, his attitudes may be characterized by the term "aversion to change."

There is an internal and an external phase to these attitudes. If an attitude is identified by the influence it has upon the internal operation of the farm, this is identification by the internal phase. The same attitude may be identified by its external phase through the relation it establishes between the farm and an external firm or institution. For example, a farmer whose attitude prohibits him from accepting credit implies by this attitude that he does not want, under the terms specified, the additional resources which credit might empower him to obtain.

Low-income farms. On the low-income farms of the South, aversion to change is the predominant attitude. These farms may be identified roughly as those in Economic Classes V and VI in the census classification of farms. Experience in working with low-income farmers indicates that they consider it impossible to catch up with the present tempo of economic advance, and have chosen to conduct a holding operation to preserve a known mode of existence as long as possible. The internal phase of their aversion to change manifests itself in their effort to preserve the system of farming with which they are familiar, but the external phase is linked with each internal phase. The terms for available credit may be so stringent that, given the relatively large volume of credit which may be required to transform the farm into a thriving commercial unit, the fear of losing all that is now possessed prevents the accomplishment of change of any magnitude, except over very long periods of time. (Discussions related to this problem are presented in Chapters 13, 14, and 20.) Success may hinge upon the maintenance of good health, curtailment of leisure, or the mastery of new farming

methods. Future benefits may not be visualized with sufficient clarity to cause the farmer to assume the risk and expend the necessary effort to learn, particularly if he regards the learning process to be costly and of considerable duration (cf. discussions in Chapters 22 and 23).

In communities where low-income farms are common, individuals also may fear the social ridicule resulting from failure and foreclosure. Even if successful, they realize that a change in income will affect their social status and that ostracization by existing acquaintances may occur. In order to change materially the organization and operation of his farm, a low-income farmer must deal with marketing firms or factor supply houses with which he is unfamiliar. These will likely be large concerns, and he may feel incapable of dealing with them in equitable terms, so he shuns any opportunity to do so. Or there may be a feeling of social inferiority associated with these contacts, as was the case in one instance of our experience in which the farmer felt that to attend a purebred heifer sale would be to step over a distinct social boundary. Whatever the reasons for these attitudes, the typical low-income farmer has decided that the gap to be spanned in bringing his farm up to modern commercial standards is more than he can negotiate.

Medium-income farms. In many respects, aversion to change by operators of medium-income farms is similar to that found for low-income farmers. These are farms with characteristics below par for thriving commercial farms of similar types, but which distinctly are not low-income farms. They fall, for the most part, in Economic Classes III and IV. The operators of such farms formulate attitudes on much the same basis as low-income farmers; but they tend to give greater consideration to market conditions, perhaps because their economic isolation is less pronounced as they are more familiar with price and income relationships. They are aware of the general nature of the technological and economic knowledge required in modern farming, but their awareness is so limited that they become confused and frustrated. Under the repayment conditions associated with available credit, medium-income farmers are unable to visualize with sufficient clarity the line of action that must be taken to reorganize their farms successfully. Consequently, they tend to postpone or evade decisions essential to change and cling to their present system; or if they do change, the process occurs in a piecemeal or partial form. Failure in the use of credit in accelerating farm adjustments because of unfavorable price behavior or improper management would, in their view, destroy their sources of livelihood more rapidly than a gradual decline through failure to reorganize.

High-income farms. There may be ways high-income farms can be reorganized which will not result in loss in net income, and which will enhance communitywide change. Credit may be required to accomplish such reorganization. But these farmers may reject the use of credit for these purposes because they fear that, in destroying the status quo, their prestige will be undermined.

Not all high-income farmers are averse to change, and of those who are, other reasons may exist for their being averse to change. Changes



in external relations become necessary as farms are reorganized, regardless of the size or income level. Managerial responsibilities change and new methods must be learned. Alternative investments in nonfarm activity may appear more favorable to the operator, and further growth of the farm is curtailed as funds are channeled elsewhere. The question of how the farm business may be transferred intact from one generation to another may also inhibit change.

### Propensity to Change

Farmers who decide to improve their income levels or attain some higher goal with respect to economic and social status tend to have attitudes which are characterized by the term "propensity to change." An individual with a high propensity to change looks with favor upon the rewards associated with successful development of his farm, and is not disturbed by the possibility of failure, increased managerial responsibilities, the dangers of ill health, social ridicule, and other fears which usually inhibit those who are averse to change.

Propensity to change implies more than the simple willingness or desire to change. It includes the ability to develop and operate a farm exhibiting the technical and organizational characteristics of modern agriculture, together with the power to accomplish such an undertaking.<sup>3</sup> In the preceding section it was taken for granted that an individual who chose to pursue a holding action would possess the ability and power to do so. This is a characteristic assumption when discussing aversion to change. But in considering propensity to change, one feels impelled to stress the fact that ability and power to change, in addition to desire, are required. Only if all three seem real to the individual will positive attitudes toward change come to the forefront in his mind.

In contrast with aversion to change, propensity to change requires a greater expenditure of energy by an individual. Mechanically, it is the difference between accelerating and decelerating relative to one's environment. But the concepts are the same since both involve those attitudes which provide the basic links between the internal operation of the decision-making unit and the environment external to it.

Propensity to leave the farm. Given the fact that technological advances in agriculture lead to a decline in the farm labor force, propensity to change must also encompass attitudes toward nonfarm activity. These include the desire to obtain nonfarm employment, the ability to master the skills involved, and the power to make the transition. For those who are of retirement age, the change may be to noncommercial farm activity of a suitable nature; i.e., people who contemplate retiring cannot be expected to look forward to a world of idleness, yet the rigors

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<sup>3</sup> Ability may be latent in the sense that an individual has the capacity to learn the essential managerial skills, but they have not yet been mastered. In this case, power to change must include the economic power to gain control of essential resources and to learn how to use them through formal or informal training.



of modern commercial farming may overtax their energies. Although many such individuals may have been commercial farmers with a high propensity to change, as they reach retirement age their attitudes will likely shift in the direction of aversion to change unless retirement activities of a nonfarm or part-time or residential farming nature which appeal to them are developed.<sup>4</sup>

Variation of propensities. The implication that attitudes may shift as individuals become older suggests that farmers' attitudes vary under different circumstances. Certainly age is an important factor. Closely associated with age is experience, both vocational and social experience. The level of formal education is also highly influential, not only because education improves an individual's knowledge of his environment, but his self-confidence is affected also (Chapters 22 and 23). Tenure status has a bearing on individual attitudes because of the social significance and the degree of control over resources associated with various tenure gradations. It is not the purpose here to elaborate upon how attitudes vary (this aspect is discussed adequately by Bohlen and Beal in Chapter 20) but rather to conceptualize the relationship between the attitudes of individual farmers and credit policies.

The role of credit. Through analyses of the circumstances which give rise to the attitudes of individuals, the power of credit institutions may be directed toward creating a situation wherein their attitudes shift from aversion to change to a state of propensity to change. It is important to note that much attention has been given to generating the desire to change through various kinds of advertising media in this country, and that our educational system is oriented toward creating individual ability to change. In the nonagricultural sectors of the economy, various financial devices, ranging from corporate structures to installment credit systems, have been created to provide the power to change.

It appears that less emphasis has been given to these matters in the farm sector. We have an elaborate research organization to develop the technological changes for farmers; the Extension Service and related educational activities are organized to convey knowledge of these innovations to the agricultural sector. The magnitude of the changes which many farm families must make as a result of research and development exceeds, in our opinion, the power of farmers to change under current policies of credit and related institutions. Without the power to change, technical and economic information transmitted through the Extension Service is far less meaningful to farmers, and aversion to change becomes the predominant attitude. To create a propensity to change in its full meaning requires not only greater persuasive ability on the part of educational agencies, but also provision of the power to change. This condition is considered to be the role of credit.

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<sup>4</sup> Policies pertaining to noncommercial farming need to be developed carefully and integrated with those discussed in the last section of this chapter.

## THE DESIGN OF CREDIT POLICY

In the past, credit policy has been closely associated with efforts to increase farm income largely through increases in output. The main purpose of agricultural credit policy, as proposed here, will be concerned with facilitating the process of resource adjustment within agriculture, and between agricultural and nonagricultural sectors. Since the nation is confronted with surpluses of various commodities, these adjustments must include the exodus of labor from the farm. This implies that non-farm work must be available; however, a nonfarm employment policy will be excluded from the analysis that follows. Whether increases in aggregate farm output will or will not result, will depend upon the nature of policies concerned with supply control.

## Variables at Our Disposal

One of the principal sets of variables subject to modification in the design of credit policy is composed of the eligibility requirements of the prospective borrower, i.e., decision-making unit. For example, real estate credit is seldom extended to an operator who does not possess title to property or who, with the credit extended, will not obtain title to property. Thus, eligibility for credit under present policy varies by tenure status and is closely associated with the value of property and the individual's equity therein. Moreover, present policies place emphasis upon past performance rather than upon future capacity to perform. A young, immature individual is less eligible for credit than a man in his prime with a well-established reputation. Future capacity is considered in a negative sense in that as one reaches retirement age, or becomes incapacitated, eligibility is likely to decline to the amount which can be amply secured by owned property. Use to be made of funds borrowed is another eligibility consideration, particularly as the size of loan approaches or exceeds security limits.

Closely related variables include size of loan, interest rate, and repayment conditions. In fact, these are variables in terms of which eligibility is quantified. If a credit institution is to change the rate of farm adjustment, it must alter its criteria for judging an individual's eligibility by modifying the volume and types of credit offered, the interest rate charged, the conditions of repayment, and the associated contingencies such as restrictions on the use to be made of borrowed funds — as suggested previously by Murray, Diesslin, and Engberg. Modification must be made to the point where, in the judgment of the prospective borrower, it is distinctly to his advantage to accept the credit terms offered. His attitude then shifts from one of aversion to one of inclination or propensity to change.

In overcoming aversion to change by altering the terms of eligibility, the credit institution cannot completely relinquish the balance of power in deciding upon the limits within which a borrower's action must take

place. Its power to effect change would be quickly dissipated if this were the case, and it would become bankrupt. It can, however, alter the limits within which the borrower may act, perhaps closing off previous avenues and opening new ones, as will be suggested in the following sections.

### Credit To Facilitate the Exodus of Labor

Although it will not be possible to examine the adjustments needed in agriculture in detail here, clearly there must be further exodus of labor from farms, particularly in the low-income areas of the South. This is necessary to improve incomes of those who leave, and to make it possible for those who remain to regroup resources into more profitable units. Hendrix and Lanham ably developed this point in their discussion.

It is proposed that the Soil Bank program be modified, making it possible for individuals who own real estate to place their farms in the Soil Bank and draw at an accelerated rate — even to the extent of one lump sum — the conservation reserve payments which are now made over an extended period.

In order to encourage release of land for future utilization by those who remain in agriculture, the U. S. Department of Agriculture would make accelerated payments on the condition that farms could be (1) purchased by the Department at prices determined at the time farms were placed in the Soil Bank, or (2) leased by the Department to other operators. Either the Department or the individuals could request that the purchase agreement be exercised at any time while the land is in the Soil Bank. An individual could prevent the Department from exercising the purchase agreement only by repaying all funds received in the form of Soil Bank payment plus, perhaps, a specified interest charge. If neither chose to exercise the purchase agreement, the farm would revert to the individual upon expiration of the entire period for which the land was committed to the Soil Bank. If the Department of Agriculture chose to lease a farm to another operator, the rent would be retained by the Department. The owner could continue to lease the farm if he so desired upon expiration of the Soil Bank agreement. In order to induce individuals to place farms in the Soil Bank under these conditions, an incentive bonus could be offered above the regular rate.

Individuals of retirement age who find this program attractive could use the accelerated payments to purchase dwellings within their home communities or in distant communities. Their social security payments would then come nearer to providing them with an adequate standard of living. They could also anticipate additional revenue from sale of their property in later years.

Farmers who are young enough to consider nonfarm employment could utilize the accelerated payments to finance moving, vocational training, and other expenses associated with changing occupations. Once



the transition is made, revenue from the sale of their farms could be used to finance the purchase of dwellings near their new employment location.

Turning next to individuals and families without title to real estate who may be induced to leave the farm labor force — tenants, croppers, and hired laborers — it is proposed here that those who are capable of becoming qualified for nonfarm employment be extended credit to finance moving, vocational training, or other forms of education, and minimum living expenses during the transition period. Credit extended would be to upgrade the earning capacity of the individuals and would be contingent upon their executing a carefully developed plan for training and employment (cf. Mackie's discussion in Chapter 22). Their age and ability would need to be considered carefully, and guidance provided by appropriate agencies to insure execution of plans or modification when necessary. A low rate of interest would be charged and an extended repayment period prescribed, possibly on a payroll deduction basis after the individuals obtained employment. In urban centers where it is considered feasible to do so, low rental housing could be provided during the transition period. Based on the experience of the authors, it would seem that attitudes of farm families toward the use of credit for these purposes will hinge largely upon the care with which plans for self-improvement are developed and executed.

For those individuals and families without title to real estate who are of retirement age, it is proposed that low rental housing be provided in communities within reasonable distance of their present location. Effort in this connection would contribute to the reorganization of agriculture in several ways. For example, the young couple that is providing a home for one or more parents may be averse to leaving a low-income farm for nonfarm employment because of anticipated city costs of supporting extra members of the family.

### Credit To Facilitate the Reorganization of Farms

For those who remain in farming, credit should be made available to farm operators to enable them to gain control of resources and to develop their managerial ability, which will enable them to obtain incomes comparable to the compensation in other occupations requiring similar skill and energy. The objective of the policy is to establish an adequate operating unit on a continuing basis, and to relate the operator and his family to this unit in such a way that their initiative and proprietary interests are maintained at the highest possible level. Resources will be leased or purchased, depending upon the circumstances. Credit will be extended in amounts necessary to establish an "adequate" unit, provided that in planning the development and operation of each farm, the imputation of returns to the resources is consistent with the price or rent per unit. No units will be established which are too small to provide income levels comparable to that which families could obtain in other pursuits.

Where feasible, farms may be incorporated and credit provided to support the marketing of corporate stock or the purchase of a controlling interest when shares are not salable at par value. When incorporation is not considered feasible, credit will be extended on a long-term basis, subject to renewal when arrangements are adequately provided for continuity of the farm between generations. Credit totaling \$80,000 to \$100,000 or more per farm will be necessary to establish or reorganize farm units on a scale that will be adaptable to change and consistent with returns to labor equal to those earned in alternative employment.

Credit will also be extended to cover costs associated with training individual operators as well as for the acquisition of necessary physical resources. Training may range from a short course of a few weeks' duration for those with appropriate experience to as much as four years of college for young men with little experience. For those in this latter category, the credit advanced will be similar to that extended to young men who leave the farm. Those who have decided to remain will have oriented their education toward agricultural pursuits, and upon completion of their training, the credit advanced for this purpose will be combined with that required to establish them in farming.

### Rate of Reorganization

With respect to the reorganization of farms by those who remain, the rate at which organization must occur will depend upon the production requirements, which would be specified by policies concerned with the product markets. Unless increased use of so-called surplus commodities is foreseen at home or abroad, the rate must proceed rather slowly since reorganization involving the use of new technology leads to increased output. The emphasis in the beginning should be concerned with the development of a sound basis for reorganization, rather than in reorganizing farms at the maximum rate. This may be accomplished by inducing individuals to place their farms in the conservation reserve for extended periods. For example, if a farm is placed in the Soil Bank for ten years, and if within that time production requirements increase to the point where it becomes necessary to bring it back into production, the U. S. Department of Agriculture could exercise its right to purchase or lease the farm and establish a new operator or combine it with a unit operated by someone who has remained in farming.

The rate and quality of farm reorganization may also be influenced by the nature of the educational program established. Clearly the use of large quantities of credit to establish large and efficient farm units must be based upon careful planning and either considerable training of the operator or a great deal of supervision. The cherished processes of "growing into farming" and associated "learning by doing" have become outmoded. An inexperienced farmer cannot be placed in charge of a \$100,000 operation. An individual is not likely to "grow into" this position within a lifetime, considering present rates of profit in farming.

Moreover, a supervisory service large enough to provide the management on the \$100,000 operation while the operator learns to master the business is too expensive.

### The Shift in Attitudes

In proposing these changes in policy, it is contended that the attitudes of farmers toward credit and capital which are classified under the heading "aversion to change" may be transformed into those which are grouped under the heading "propensity to change." Underlying this contention is the belief that, given their state of knowledge, the resources at their disposal, and the risks associated with present alternatives open to them, farmers are behaving rationally in formulating their present attitudes. Based upon our experience, it is our view that an educational program alone, aimed at simply acquainting low- and medium-income families with how additional capital may be used to improve income or with the fact that nonfarm wage rates exceed their own earning rates, will not alter these attitudes at the desired rate.

### Administrative Structure

The magnitude of the problem of farm reorganization varies among individuals and among geographic regions in the United States. Hence the administration of programs designed to cope with this problem must vary from one region to another, and must be capable of differentiating among individuals within a region.<sup>5</sup> Enabling legislation should be passed on a national basis, but geographic areas or regions should formulate plans for development and establish administrative units which will unify activities of various agencies involved. Two advantages of the suggested approach are: (1) it facilitates the adoption of policies to fit specific regions, and (2) appropriations necessary for a program of this nature on a national basis would be huge, hence regional appropriations might be easier to obtain.

Space does not permit an elaboration of the public and private administrative structure that must accompany the suggested reorientation of our agricultural credit policy. Clearly, what may be construed as credit policy must shade off into other policies in many instances. Existing credit institutions could be reorganized to accomplish much of the financing associated with the reorganization of farms. The Department of Health, Education, and Welfare has limited programs designed to assist individuals in shifting occupations or improving their productive capacity. These and similar programs could be accelerated for individuals who leave agriculture. Private credit institutions should be encouraged to

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<sup>5</sup> Area development research under way in the Southeast, designed to estimate supply functions, to suggest optimum enterprise organizations, or to suggest profitable shifts in resource ownership, should provide useful data for guiding administrative decisions.



modify their policies to the extent that their financial strength will permit. Continued use of insured loans could be made in channeling private funds into financing the reorganization of a reduced number of farms or the transfer of individuals to nonfarm work, although some subsidization of interest rates may be necessary if our nation continues to rely heavily upon monetary and fiscal policy to control inflation. Since it is assumed that price support and production control policies will be flexible enough to reflect increased production efficiency, a portion of expenditures going into these programs might be better channeled into providing farm reorganizational assistance. Educational institutions, including the agricultural extension service and nonfarm vocational training schools, would become closely involved in training individuals for farm and non-farm work.

Private credit institutions would likely gain materially from such activities because both urban and rural economic activity would be enhanced. In the process of channeling funds into these activities, additional taxes or the transfer of funds from other uses should be utilized, except during periods of recession, because the program could have an inflationary effect. It is also important that policies concerned with non-farm employment levels be oriented so that the nonfarm sectors of the economy could absorb additional labor released from agriculture.

### Shift in the Structural Location of Decision-Making

The proposed policies shift the structural location of decision-making in this sense: Credit institutions, in offering the terms of credit to induce individual farm operators to change, would be exerting active power in guiding the course of economic activity. Their power is passive in the sense that individuals are free to accept or reject the terms offered. But if individuals alter their attitudes and accept power to change inherent in the credit extended, decisions of credit institutions, with respect to the nature and direction of economic change, take on added significance. In effect, the seemingly impersonal power of the market mechanism in guiding individual activity is being supplemented by the decisions of credit institutions in conjunction with other policies governing orderly growth. This effect must be made explicit and thoroughly understood because the responsibilities of credit institutions become greatly increased.

# Discussion

M. R. JANSSEN\*

The description by Coutu and Lindsey of the causes and extent of internal and external capital rationing is similar to the results of a recent credit use study in a commercial farming area of central Indiana.<sup>1</sup> Low-income farms were not included in the study, although there are few low-income farms in central Indiana that are not part-time farms or farms of semi-retired operators. Thus, a part of the adjustment suggested for the Southeast is occurring in other areas where off-farm opportunities exist. In one agricultural township in central Indiana, a surprisingly large number of rural residents had off-farm employment; a substantial number of members of farm families also had employment outside agriculture.

Of the farmers in the Indiana study with over 100 acres and without substantial off-farm employment, only 29 percent had less than \$20,000 invested in their business, and almost 50 percent had an investment of over \$40,000. Ninety percent of the farmers studied had over 60 percent equity in their businesses. Twenty-two percent used no credit, so it would seem that there is no major credit problem in this commercial farming area. However, investigation of the type of farm unit that would provide full-time profitable employment, if capital were available, revealed that about 11 percent of the farmers did not wish to increase size of business because of limitations such as age or health. Some 14 percent of the farmers having an excess of \$100,000 investment in the business could not profitably invest additional capital in the business. The remaining three-fourths of the farmers had some form of capital rationing. Sixty-five percent of the farmers operated under the restrictions of internal capital rationing, while only 10 percent were faced with external capital rationing.

Data obtained from the study of 110 farmers in central Indiana who were faced with capital rationing were used to test the hypothesis that internal capital rationing was a function of net worth, reaction to uncertainty, knowledge, attitude, and age of the operator. In a linear regression analysis, net worth, knowledge, and reaction to uncertainty were significant at the 5 percent level. Attitude was significant only at the 13 percent level, and age was not significant. The correlation between age and net worth was relatively low. The coefficient of multiple determination differed significantly from zero at the 1 percent level. The regression explained only 27 percent of the variability. More research

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<sup>1</sup>L. F. Hesser and M. R. Janssen, Capital Rationing Among Farmers, Purdue Agr. Exp. Sta. Res. Bul. 703, Sept., 1960.

must be conducted if we are to improve measurements of values and attitudes. In this study, the Guttman Scalogram analysis was used with a series of statements in which individuals indicated their degree of agreement or disagreement with the statements. When these statements were properly selected and ordered, a continuing scale resulted which indicated the relative degree of attitudes or values of individuals.

Coutu and Lindsey recommend the adoption of a policy of extension of credit to low-income farmers to train them for off-farm employment and to move them from farms to places of nonfarm employment. This policy can be employed well and with limited cost in areas with as good opportunities as are afforded in many parts of the East North Central states. However, the costs of moving from those areas where only limited opportunities exist are substantial. The risk of unemployment after moving from such areas is also great, as few alternative opportunities exist until seniority is achieved in the new employment. These difficulties must be recognized if any such approach is to be successful.

Coutu and Lindsey also recommend a policy of credit extension for farm reorganization. Obviously, farmers on the reorganized farms will need to make adjustments, but these needed adjustments seem to be less harsh than those of moving out of agriculture. For this reason, the problem of determining who will move out and who will remain in agriculture must be dealt with adequately. Assuming that administrative machinery can be devised to carry out the program, how can the decisions as to who should continue in farming and who should be encouraged to seek nonfarm employment be implemented? Thomas has provided professional farm managers an objective method of selecting tenants for farms they manage.<sup>2</sup> While the method is not applicable, the system is likely to provide a means of selecting those farmers with the highest probability of success in agriculture relative to nonagricultural pursuits.

#### WAYNE A. CORPENING\*

Coutu and Lindsey indicate two broad approaches that should be taken to overcome the problems of periodic reorganization in agriculture. One is concerned with policies related to product markets; the other relates to factor markets. In short, they say that aggregate farm supply must be controlled and price stabilized for proper distribution of income within agriculture, and between agriculture and the nonagricultural sector, if the task of reorganization is to be accomplished in an orderly fashion. They state that age and tenure status of farmers have much to do with actions.

In discussing the design of credit policy, they point out that lending institutions have much to do with the changes in reorganization that occur, and that some of the present policies might not be best for all

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<sup>2</sup>D. W. Thomas, E. J. McCormick, and R. E. Blanchard, *An Objective Method of Selecting Farm Tenants*, Purdue Agr. Exp. Sta. Bul. 678, April, 1959.

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concerned. An example is the emphasis placed on past performance instead of on future capacity.

In order to facilitate reorganization in agriculture, the authors propose to: (1) let the federal government, through USDA, Soil Bank, and conservation payments, take the lead in helping make some of these reorganizations by making accelerated rates of payments; (2) give assistance to those leaving the farm and seeking nonfarm jobs, and also to older people in securing low rental housing in urban areas; and (3) make credit available to those remaining in agriculture on an "all or nothing" basis to enable them to gain control of resources and to develop their managerial ability. This will require about \$100,000 per farm in many circumstances.

There are many factors that determine what a farmer will do in making changes on his farm. One of the most important of these is attitude. The farmer who wants someone else to look after him is usually a person who will not be successful. The farmer should be assisted in such a way that he does not lose his self-respect, i.e., he must be a "proud person."

Also, I do not believe that those of us with an interest in agriculture are responsible for a person simply because he lives on a small farm and does not want to do better. Should a good livelihood be guaranteed to anyone who says he wants to be a farmer, and yet will not carry out recommended practices? Perhaps his family, as well as agriculture, would be better off if he left farming and took employment in industry.

I disagree somewhat with Coutu and Lindsey with respect to the rate of change of management necessary in increasing the profitability of farming. Experience cannot be replaced in farming, and it is possible to overload the borrower.

I do not claim that private lending institutions are doing the job they should be doing. Many of us are not, and much work needs to be done. But we who are interested in agriculture want this industry to be on an equal level with other sectors of our economy. In trying to accomplish this, we must not ask for too many special considerations for agriculture — a step that might ruin us.

Agricultural programs have been very important in North Carolina and the Southeast in helping to stabilize agriculture. It would have been very hard to have gotten along without them. But when we are planning for the future reorganization of farms, I do not know whether we should leave it to the "whims" of our political parties.

ARTHUR B. MACKIE  
Tennessee Valley Authority

## *Need for Greater Emphasis on Capital Investment in Human Resources*

A COMPREHENSIVE TREATMENT of society's investment in human resources would involve an analysis of the effects of increased incomes on productivity or income earning ability for those families which have low incomes. It would also include analysis of improved education, housing, recreational, and health services and facilities on total national income. Finally, it would appraise the effects of other community services which would improve the general welfare of individuals and communities. Not all of these variables or forces can be treated in this chapter; therefore, the major implications of human resource development will be illustrated by concentrating upon investment in education.

The current national interest in education and the need for a greater public investment in developing a higher quality labor force no doubt stems from the experience in manpower utilization during World War II and world economic competition.<sup>1</sup> The wartime experiences served to emphasize the need for a definite manpower policy since it was suddenly realized that this "nation did not possess unlimited manpower resources and that care would have to be taken in utilizing the available supply."<sup>2</sup> However, it was not until the development of the atomic bomb and the speed with which the Russians challenged the United States in the development of nuclear weapons that a full realization of the importance of the scientist in the contemporary world was fully recognized.<sup>3</sup> Also, during this period a fuller recognition was gained of the scientific-manpower problem and its relation to questions of economic development, and of the increasing dependence of American industry on discoveries in the laboratory.<sup>4</sup> In this scientific age, business, government officials, and economists are becoming increasingly aware that

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<sup>1</sup> Eli Ginzberg, *Human Resources: The Wealth of a Nation*, Simon and Schuster, Inc., New York, 1958, pp. 28-29; Clarence H. Linder, "Trends in industrial requirements for scientists and engineers," *Scientific Manpower 1958*, National Science Foundation, NSF 59-37, pp. 27-31.

<sup>2</sup> *Ibid.*

<sup>3</sup> *Chemical and Engineering News*, "Education 'crash' program in the works," Dec. 16, 1957, pp. 19-20.

<sup>4</sup> Phil N. Scheid, "Technical manpower accession and utilization analysis in an expanding decentralized company," *Scientific Manpower 1958*, National Science Foundation, NSF 59-37, pp. 14-26.

the limiting factor governing the nature and extent of the expansion of the American economy lies in the limit of the skills and competence of its work force. This phenomenon and the increasing interest in maintaining continuous economic growth of this country have undoubtedly been the major reasons for our growing concern about the lack of adequate education and training programs to meet this country's future manpower needs.

Need for a greater emphasis on capital investment in human resources in agriculture cannot be considered apart from national interests because of the interdependency of agriculture and the rest of the economy. National economic growth creates adjustment problems in agriculture and opens up new income opportunities for capital and human resources both within and outside of agriculture. For example, technological progress within agriculture and the changing demand structure for agricultural products serve to create a surplus labor supply in agriculture; an expanding national economy creates additional nonfarm job opportunities and a demand for surplus labor. Utilization of excess labor in agriculture to further economic growth is dependent upon employment opportunities and manpower utilization in general. For these reasons it is necessary that an examination of national manpower problems and the nation's need for greater capital investment in human resources be made before the need for capital investment in human resources through education in agriculture is considered.

### EMPLOYMENT AND ECONOMIC GROWTH

National economic growth and technological progress have brought about changes in employment opportunities as well as changes in the demand for different types of goods and services. Predictions of economic growth indicate that even greater shifts in the kind and volume of goods and services produced are to be expected.<sup>5</sup> These changes will necessarily cause important differences in the distribution of industrial employment to emerge.

The growth of the nation's labor force over the years has been accompanied by sharp changes in the relative size of different industries and occupations which have greatly affected employment opportunities. For example, the proportion of the total labor force in agriculture has declined with expansion and growth of the national economy. The shift from farm to nonfarm work will necessarily continue with expansion of the total economy and increased agricultural technology. Data illustrating this trend are cited in Chapter 1. As farm employment continues to drop and the number of farms decreases, an increasing number of our rural youth will have to look to nonfarm work. The type of nonfarm employment for which these rural young people can qualify will be determined largely by their education and vocational skills.

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<sup>5</sup> U. S. Department of Labor, Occupational Outlook Handbook, Bul. No. 1255, Washington, 1959.



Historically, the proportion of the labor force engaged in agriculture has declined with expansion and growth of the national economy. The existence of a geographic pattern of underemployed human resources in an era of rapid national economic growth has been associated with regions that have a high proportion of the labor force in agriculture.<sup>6</sup> For example, the proportion of the labor force engaged in agriculture is higher in the Southeast and the Tennessee Valley region than for the nation. In 1940 approximately 45 percent of those employed in 11 southeastern states were in agriculture, while only 23 percent were so employed for the nation (Table 22.1). The decline in farm employment since 1940 for the Southeast was greater than for the nation, but the proportion of total employment engaged in agriculture in this region was approximately twice that for the nation in 1958. These data, in addition to migration and farm income data, emphasize the existence and persistence of a surplus labor problem in agriculture and emphasize the fact that this surplus is closely related to general economic growth. Hendrix and Lanham developed this point in Chapter 14.

As with agricultural employment, industrial employment since 1940 has undergone changes which have caused alterations in employment by occupational groups. These changes in the labor forces of the nation and the Southeast between 1940 and 1950 are presented in Table 22.2 and Figures 22.1 and 22.2. These data indicate the nature of the declining employment in farming and the unskilled labor groups, and the increasing importance of the semiskilled, skilled, and scientific groups since 1940. During the 1960-70 period, changes in the distribution of employment opportunities are expected to continue with increases in the skilled and technical groups exceeding the increases in the semiskilled and nonskilled labor groups, since technological advances are expected to permit large gains in production without corresponding increases in the number of semiskilled workers.<sup>7</sup> The necessary investment capital in physical production factors required to expand output undoubtedly will be forthcoming, but the important question is to what extent will additional capital be invested in developing an adequately skilled and educated labor force to meet the changing needs of our expanding economy. Since the Southeast has the highest proportion of the total farm population, as well as the majority of the low-income or underemployed rural people, the extent to which public and private funds are allocated to the development of these human resources is expected to affect the future rate of growth for the nation. This consideration is important since one of the greatest opportunities for human resource development lies in the surplus farm labor force of the South. A more complete utilization of these human resources would make an important contribution to national and regional economic growth. It would also

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<sup>6</sup> William E. Hendrix, "Income improvement prospects in low-income areas," *Jour. Farm Econ.*, Vol. 41, No. 5, Dec., 1959, pp. 1065-75.

<sup>7</sup> U. S. Department of Labor, *Occupational Outlook Handbook*, Bul. No. 1255, Washington, 1959.

Table 22.1. Percent of Persons Engaged in Agriculture and Wage and Salary Employees in Nonagricultural Establishments, United States and Selected Areas in the Southeast, 1940, 1950, and 1958

				Percent change in employment		
	1940	1950	1958	1940-50	1950-58	1940-58
	(percent)					
<u>United States</u>						
Total employment <sup>a</sup>	100	100	100	25.6	7.9	35.6
Agriculture <sup>b</sup>	22.9	14.4	10.4	-21.3	-22.2	-38.7
Nonagriculture	77.1	85.6	89.6	39.6	13.0	57.7
<u>11 S. E. States</u>						
Total employment <sup>a</sup>	100	100	100	13.2	10.3	24.9
Agriculture <sup>b</sup>	45.1	29.0	20.3	-27.3	-22.8	-43.9
Nonagriculture	54.9	71.0	79.7	46.5	23.8	81.4
<u>7 Tenn. Valley States</u>						
Total employment <sup>a</sup>	100	100	100	11.9	5.9	18.4
Agriculture <sup>b</sup>	45.6	30.0	21.5	-26.6	-23.9	-44.2
Nonagriculture	54.4	70.0	78.5	44.2	18.6	71.0
<u>Tenn. Valley (125 Cos.)</u>						
Total employment <sup>a</sup>	100	100	100	10.6	2.6	13.5
Agriculture <sup>b</sup>	47.7	34.6	25.8	-19.9	-23.5	-38.7
Nonagriculture <sup>c</sup>	52.3	65.4	74.2	38.4	16.4	61.1

Source: Nonfarm data for the U. S. and states are from the U. S. Bur. of Labor Stat., Ann. Suppl. issues of Employment and Earnings.

<sup>a</sup>The employment estimates cover the annual average number of persons engaged in agriculture, and wage and salary employees in nonagricultural establishments including federal, civilian, and state and local school and nonschool governments; mining; manufacturing; contract construction; transportation, communication, and public utilities; trade; finance; and service. Nonfarm proprietors, domestics, and professional non-salaried trade and service workers are not included. Agriculture includes farm operators, hired workers, and unpaid family workers.

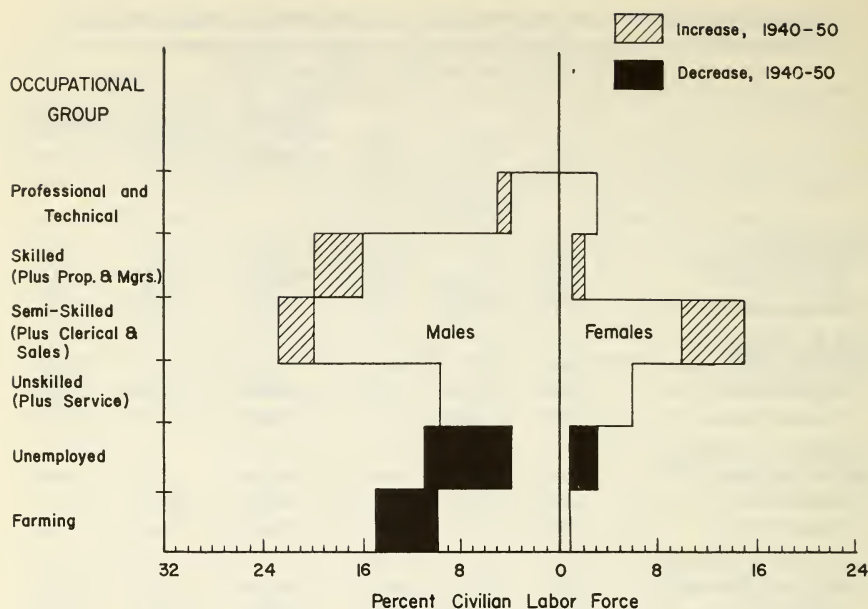
<sup>b</sup>Agricultural employment estimates for the U. S. are the annual estimates compiled by the U. S. Bureau of the Census and published in Annual Report on the Labor Force. State and county estimates were obtained by allocating a portion of the national total to states, and in turn to groups of counties in the respective states, on the basis of data from the Censuses of Agriculture and Population.

<sup>c</sup>Nonagricultural employment estimates for the Tennessee Valley, derived from the BLS state estimates, are based upon special tabulations of county data from the Bureau of Old-Age and Survivors Insurance, Census and Civil Service reports, and other related materials.

help to bring about a more efficient agriculture through better farm organization, land use, and farm enlargement.

## AGRICULTURE AND ECONOMIC GROWTH

National economic growth, which has served to create additional nonfarm job opportunities, in combination with increased production efficiency in agriculture, has provided the incentives for increased



Source: 1950 Census of Population, General Characteristics.

Fig. 22.1. U. S. labor force becoming more skilled.

labor mobility, especially among the young adult farm population. Also, underemployment of labor in agriculture and the incentives for making production and income adjustments have generally been an outgrowth of economic and technological progress (cf. Chapters 6, 7, and 14). The extent to which workers will be employed by 1975 was indicated by Baum and Bachman.

The nature and extent of underemployment of human resources are related to the changing structure of agriculture and to the relative speed with which different regions in the United States make the necessary adjustments in farm technology and resource use. Rapid national economic growth and technological progress in agriculture have accentuated underemployment and low income in the Southeast because many individuals are not prepared to make the necessary changes in their farm production or type of employment. Woodworth and Fanning (Chapter 23) and Hendrix and Lanham (Chapter 14) make similar observations. There are many barriers which inhibit or prevent many individuals from making the necessary production and income adjustments in agriculture and outside agriculture. Migration data and the rate of nonfarm job creation yield some insight about the type of adjustments being made with respect to changes in human resource use, but these data tell us little about the extent to which additional adjustments will be needed.

An examination of the agricultural census data on farms by



Table 22.2. Distribution of Employment by Occupational Groups and Sex for the United States and Eleven Southeastern States, 1940 and 1950

Region and occupational group <sup>a</sup>	1940					1950				
	Thousands of persons			Percent civilian labor force		Thousands of persons			Percent civilian labor force	
	Male	Female	Total	Male	Female	Total	Male	Female	Male	Female
United States										
Professional and technical	2,075	1,491	3,566	4	3	7	2,971	1,940	5	3
Skilled	8,261	511	8,772	16	1	17	11,888	913	20	2
Semi-skilled	10,306	5,189	15,495	20	10	30	13,320	8,643	23	15
Unskilled	5,093	3,301	8,394	10	6	16	5,748	3,376	10	6
Not reporting, employed	245	173	418	-	-	1	449	282	1	-
Unemployed	5,916	1,707	7,623	11	3	14	2,079	753	4	1
Farming	7,770	473	8,243	14	1	16	6,143	566	10	1
Total civilian labor force	39,666	12,845	52,511	76	24	100	42,598	16,473	73	28
Eleven Southeastern States <sup>b</sup>										
Professional and technical	262	241	503	2	2	4	405	335	4	3
Skilled	1,167	74	1,241	11	1	12	1,876	148	16	1
Semi-skilled	1,552	749	2,301	15	7	22	2,234	1,357	20	12
Unskilled	1,044	826	1,870	10	8	18	1,134	829	10	7
Not reporting, employed	42	31	73	-	-	1	100	63	1	1
Unemployed	904	305	1,209	9	3	12	303	138	3	1
Farming	2,974	323	3,297	28	3	31	2,233	251	20	2
Total civilian labor force	7,945	2,549	10,494	75	24	100	8,285	3,121	74	27

Source: 1950 Census of Population, "General characteristics."

<sup>a</sup> As used here, occupational groups are defined as: Professional and technical — same as given in source.

Skilled — Includes managers, officials, proprietors (except farmers), and craft, foremen, and kindred classifications in source.

Semi-skilled — Includes clerical and kindred, sales workers, and operatives and kindred classifications in source.

Unskilled — Includes private household, service (except private household), and laborers (except farm), and mine classifications in source.

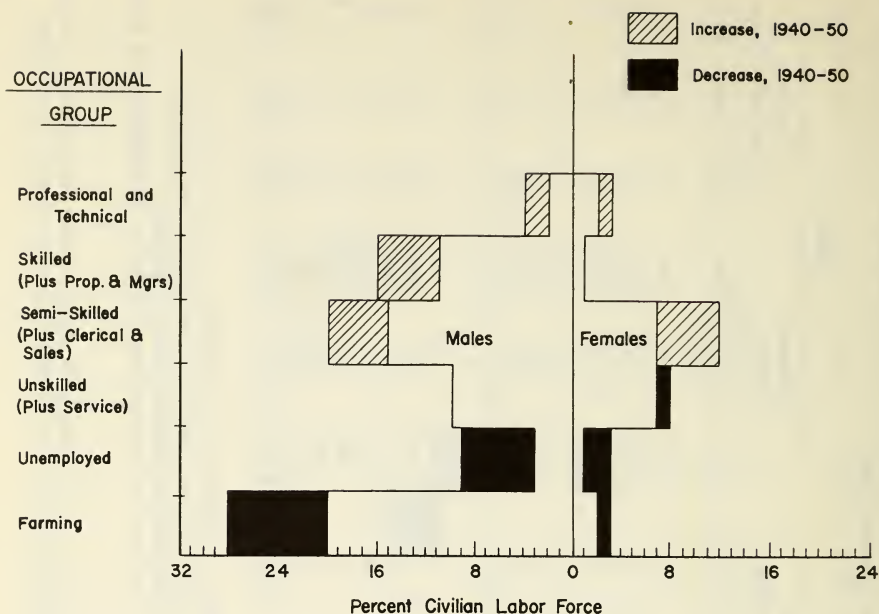
Not reporting, employed — Same as given in source.

Unemployed — Same as given in source.

Farming — Includes farmers and farm managers, farm laborers (unpaid family), and farm laborers and foremen classifications in source.

<sup>b</sup> Includes Alabama, Arkansas, Georgia, Florida, Kentucky, Louisiana, Mississippi, North and South Carolina, Tennessee, and Virginia.

\* Less than 1 percent.



Source: 1950 Census of Population, General Characteristics.

Fig. 22.2. Farm employment declines in Southeast.

economic class gives some additional knowledge of the relationship of agriculture to economic growth, and of the nature of adjustment problems in agriculture resulting from further improvements in agricultural technology. From 1930 through 1954 the number of all commercial farms and each individual grouping of commercial farms, except for Economic Class I farms which increased from 1950-1954, declined in absolute terms. The most drastic decline in the number of farms was in the low-income small-scale commercial farms. As farm production technology and efficiency continue to increase, these low-income farmers, as well as most rural farm youth, will find it increasingly difficult to find productive employment in agriculture. However, rural people, especially those in the low-income group, generally have the least qualifications for entering the nonfarm labor force in terms of age, education, and vocational training.<sup>8</sup> Therefore, these people must enter the nonfarm labor force at the unskilled level where the demand for this type of labor is decreasing relative to other occupational groups.<sup>9</sup> In terms of their contribution to total economic growth and national income, these rural people will be able to make a limited contribution because of their lack of education and training. Additional

<sup>8</sup> Arthur B. Mackie and E. L. Baum, Problems and Suggested Programs for Low-Income Farmers, Div. of Agr. Rel., TVA Report T 60-2 AE, Oct., 1959.

<sup>9</sup> Ewan Clague, Testimony before Special Subcommittee on Unemployment Problems, United States Senate, Oct. 7, 1959.

capital investment in human resources, both in basic education for the rural youth and in vocational training for all rural people entering the nonfarm labor force, would no doubt prove to be a profitable investment for the nation.

### NEED FOR GREATER EMPHASIS ON INVESTMENT IN THE HUMAN AGENT

The existence of low incomes, or underemployed labor resources, in agriculture and the changing demand structure for labor in the non-farm sector serve to emphasize the importance of achieving an "investment balance" in capital allocated to material and human resource development.<sup>10</sup> Greater emphasis on investment in human resources is needed to overcome the historical concept — which is still predominantly held — that only physical resource development and material capital are essential to technological progress and economic growth. Emphasis on the need for a greater investment in the human agent by the National Science Foundation,<sup>11</sup> U. S. Department of Labor,<sup>12</sup> Galbraith,<sup>13</sup> Ginzberg,<sup>14</sup> and others,<sup>15</sup> has done much to bring about a better understanding of the need for and the relationship of capital investment in human resources to economic growth.

The necessity for a greater emphasis on capital investment in human resources grows out of (1) the need for obtaining a wider acceptance of the idea that capital expenditure in human resource development is an investment which yields returns to society in terms of a more productive and competent labor force, and (2) the inability of the market system to allocate capital between physical and human resource development activities in a manner that is conducive to maximum economic growth. The first aspect of the problem involves a historical attitude that places more value or importance upon physical capital investment — especially private — than upon investment in human resources. The second consideration grows out of the first, since

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<sup>10</sup> John Kenneth Galbraith, *The Affluent Society*, Houghton Mifflin Company, Boston, Mass., 1958, pp. 270-80.

<sup>11</sup> *Scientific Manpower*, 1958, *op. cit.*

<sup>12</sup> *Occupational Outlook Handbook*, *op. cit.*

<sup>13</sup> Galbraith, *op. cit.*, pp. 270-80; see also an article by Galbraith, "Men and capital," *The Saturday Evening Post*, Mar. 5, 1960.

<sup>14</sup> Ginzberg, *op. cit.*

<sup>15</sup> A partial listing of the literature would include: Earl O. Heady, "Adaptation of extension education and auxiliary aids to the basic economic problem of agriculture," *Jour. Farm Econ.*, Vol. 39, No. 1, Feb., 1957, pp. 112-27; USDA, *Development of Agriculture's Human Resources — A Report on Problems of Low-Income Farmers*, Washington, April, 1955; Arthur Moore, "Underemployment in American agriculture, a problem in economic development," *Nat. Planning Assn. Pamphlet No. 77*, Jan., 1952; Theodore W. Schultz, "Reflections on poverty within agriculture," *Jour. Polit. Econ.*, Vol. 58, Feb., 1950; E. L. Baum and Earl O. Heady, "Some effects of selected policy programs on agricultural labor mobility in the South," *The Southern Econ. Jour.*, Vol. 25, Jan., 1959; C. E. Bishop, "The mobility of farm labor," *Policy for Commercial Agriculture — Relation to Economic Growth and Stability*, Joint Economic Committee Report of the Subcommittee on Agricultural Policy, 85th Cong., 1st Sess., Washington, 1957.



investment in human resources does not command a direct market price. Therefore, such investment must be made outside the market system through the expenditure of public funds. Since capital investment in human resources is left to the area of public domain, there are few, if any, effective criteria for channeling adequate quantities of capital into human resource development. There is important need for a realistic accounting system that would clearly define the costs and gains from additional investment in education, i.e., a national balance sheet.

Historically, the United States has recognized the importance of education in developing an enlightened citizenry to better perform their civic and political responsibilities. However, the economic importance of education has not been fully recognized or related to economic benefits. Part of the explanation for the slowness of our society to appraise adequately the value of education and training, and to relate such benefits to national manpower problems and needs, has been our preoccupation with the assumption that adequate investment in education would be taken care of by the free market system. The free market system has not prevented the malutilization of the nation's human resources. In fact, it often has encouraged malutilization through discrimination and the creation of an imbalance in rewards between the profit (business) and nonprofit (public) sectors of our economy.

Although all signs point to an ever-increasing dependence of our economy on people with high orders of skills and competence, the public has been very slow to increase the share of our national income devoted to education. Inadequate investment in the educational preparation of Americans is not limited to illiteracy, which is an extreme example of neglect. Rather, it more nearly lies in the unwillingness of a large portion of our population to provide adequately primary and secondary education for the youth, especially in the Southeast. The significance of an inadequate investment in educational preparation of youths is dramatized by the rejection rates of registrants given mental tests by the Selective Service System from 1951 to 1958.<sup>16</sup> During 1953-54 one-third of all young men screened for military service were placed in Mental Groups IV or V, which means that because of their low intellectual achievement they were either rejected for service (V) or found unacceptable for advanced training (IV). Only 23 percent of the males from the western states were in these two lowest classes, while almost 53 percent of the selectees from the southeastern states were so classified.<sup>17</sup> These figures suggest that not only does the South have fewer high school graduates, but the quality of their schooling is inferior to other parts of the nation. The data on the expenditure per pupil for secondary and primary education by states suggest that the low level of such investments in the southern states is not entirely

<sup>16</sup> Lee R. Martin, "Investment in human resources: a solution to the low-income problem," Unemployment Problems, Hearings Before Special Committee on Unemployment Problems, United States Senate, 86th Cong., 1st Sess., 1960, Part 5, p. 2186, Table 6.

<sup>17</sup> Ginzburg, *op. cit.*, p. 57.

unrelated to the educational achievement and performance of youths in military service or in civilian employment.<sup>18</sup> Martin presented data on this subject in Chapter 4, Table 4.1.

The importance of education and its manpower implications is essentially twofold: (1) individuals acquire skills by building upon what they learn in school and environment; and (2) society and industry can make additional investments in individuals in the form of additional training, and hence, skills, if the initial investment in basic education has been made. The returns on the initial investment in primary and secondary education are not limited to the immediate income earned, but to the fact that secondary and higher order investments can be made by industry or society in additional training. The possibility of additional training means an expansion of the lifetime income opportunities for an individual. This additional investment opportunity means that industry can alter the make-up of its labor force to meet its changing demand for skills which results from technological advances and economic growth. In addition, a third benefit accrues to communities that have made adequate investment in primary and secondary education because business will be more easily attracted to the areas that have a well-educated labor force. One of the present difficulties encountered by many communities in the South in attracting industries is the low level of education of their labor force. Not all industries seek out surplus labor areas because of low wages; rather, low cost labor considerations may be incidental to labor productivity considerations.<sup>19</sup>

#### EDUCATION: AN ESSENTIAL REQUISITE FOR SUCCESS IN AGRICULTURE

The benefits of additional education are not limited to the nonfarm sectors. Agriculture, like other industries, is becoming more scientifically oriented, and is thus demanding greater competence of its labor force. The demands for an efficient farm organization, and all that this implies for increased technology, increased capital needs, and improved management to command and utilize land, labor, and capital resources, will continue to increase in importance. The implication of these factors is that agriculture is becoming more complex and business-oriented. As agriculture becomes more business-oriented, the manner in which capital, land, and labor are utilized and managed will materially affect the ability of individual farm firms to remain competitive. In this economic environment, education of farm operators will become increasingly important as a limiting factor in achieving desirable living standards. The relationship of educational attainment to income of farm operators in 1950 is clearly indicated by the

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<sup>18</sup> Martin, *op. cit.*, p. 2172.

<sup>19</sup> *Ibid.*

higher proportion of farmers in Economic Classes I and II who had graduated from high school than was true for lower income farmers (Table 22.3). Obviously then, with continuous national and regional economic growth, education will become an important factor governing the future success of individuals remaining in agriculture, or those leaving agriculture for nonfarm work. The implication of a low level of educational attainment for low-income commercial farmers — those who are being forced out of agriculture — is that these rural people will continue to experience great difficulty in competing for nonfarm jobs. Furthermore, education will become increasingly important to rural youths since the educational level and skills of the total labor force continue to rise. For example, in 1957, 38 percent of the people 25 to 34 years of age had completed high school, while only 14 percent of those who were 55 years of age and over had this much schooling. Two-thirds of the population 18 years of age in 1958 had completed high school, whereas only about 1 out of 15 in 1900 had done so.<sup>20</sup> Many factors have contributed to this rising educational level. One important factor has been the increasing complexity of skills demanded in modern industry. To meet such requirements, employers have raised

Table 22.3. Years of School Completed by Farm Operators by Economic Class of Farms for the United States, 1950<sup>a</sup>

Years of school completed	Total all farms	Commercial farms <sup>b</sup>					Total commercial farms	Part-time and residential
		I and II	III	IV	V	VI		
		(percent distribution)						
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
None	2.7	0.4	0.8	2.0	3.0	5.9	2.6	3.0
Elementary:	66.4	42.8	59.1	66.9	72.2	78.5	65.7	68.0
1 to 4 years	14.9	4.0	5.5	10.3	19.0	27.3	13.9	17.3
5 to 6 years	13.8	5.6	8.2	12.7	16.1	17.9	12.7	16.3
7 years	10.8	7.4	8.8	10.5	11.5	13.3	10.5	11.6
8 years	26.9	25.8	36.6	33.4	25.6	20.0	28.6	22.8
High school:	25.3	42.7	33.3	26.5	20.5	14.1	26.1	23.4
1 to 3 years	14.3	16.4	16.0	15.5	12.6	10.7	14.1	14.9
4 years	11.0	26.3	17.3	11.0	7.9	3.4	12.0	8.5
College:	5.6	14.1	6.8	4.6	4.3	1.5	5.6	5.6
1 to 3 years	3.6	9.4	5.1	3.0	2.8	0.9	3.8	3.2
4 years or more	2.0	4.7	1.7	1.6	1.5	0.6	1.8	2.4

<sup>a</sup> Farms and Farm People—A special cooperative study by the U. S. Depts. of Com. and Agr., Bureaus of the Census and Agricultural Economics, Washington, D. C., 1953, p. 59.

<sup>b</sup> Commercial farms were classified by the 1954 Census of Agriculture into the tabulated economic classes in accordance with value of sales:

Economic class	Value of sales
I	\$25,000 or more
II	10,000 to 24,999
III	5,000 to 9,999
IV	2,500 to 4,999
V	1,200 to 2,499
VI	250 to 1,199

<sup>20</sup> Occupational Outlook Handbook, *op. cit.*, p. 13.



the educational qualifications for many jobs, especially for the more skilled occupations. The importance of increased educational requirements for the more skilled jobs is reflected in the data presented in Table 22.4 on educational attainment by occupational employment for those individuals working in 1959. These data indicate that the importance of education should continue to increase for rural farm youths seeking nonfarm employment opportunities.

The discussion thus far suggests the following means to improve incomes and investment in those human resources remaining in or leaving agriculture: (1) expansion of existing basic educational programs; (2) improvement of existing educational programs to include more vocational training and guidance, and other related services for the young and adult farm population leaving agriculture; (3) improved agricultural education programs for the adult farm population remaining in agriculture; (4) reallocation of present funds among existing program activities in line with changing demand for labor and employment opportunities; or (5) combinations of the above methods.

### OPPORTUNITIES FOR INVESTMENT

Generally, the essential features of a desirable national education program exist, but a critical review of our current programs with respect to objectives and needs should be undertaken to provide the basis for making the necessary adjustments and improvements in educational programs to meet existing and future production and manpower needs.

An expansion of existing educational, training, and service programs would involve a change in attitude on the part of society toward public expenditures (investments) before additional funds can be obtained. The belief that public expenditure for education is a consumption

Table 22.4. Educational Attainment by Occupation Group  
for Those Employed in the United States in 1959

Occupational group	Educational attainment levels			
	Average years completed	Percent with		
		Less than high school	High school graduation	Some college
Professional and technical	16.2	6	19	75
Proprietors and managers	12.4	38	33	29
Clerical and sales	12.5	25	53	22
Skilled	11.0	59	33	8
Semi-skilled	9.9	70	26	4
Service	9.7	69	25	6
Unskilled	8.6	80	17	3
Farmers and farmworkers	8.6	76	19	5

Source: Manpower Challenge of the 1960's, U. S. Dept. of Labor, U. S. Govt. Print. Off., 1960.

item will have to be replaced by a recognition of it as an investment item. Also, the belief that sufficient funds for development of human resources can be obtained through the market system will have to be replaced with a recognition that such capital investments are in the area of the public domain, and therefore, need separate investment criteria.

One of the reasons why this nation is faced with an inadequate investment in human resources resulting from outdated concepts has been the lack of sufficient research on the economic impacts of education on the nation. More research has probably been done on the benefits of education to the individual than on the total economic return to the nation in terms of its effect upon total national income. The effects of education upon labor mobility in agriculture have been pointed out<sup>21</sup> as well as the effect of education on income level,<sup>22</sup> or income potential for all individuals.<sup>23</sup> The lifetime earnings, for example, for a 25-year-old college graduate have been roughly estimated to be about \$260,000, as compared with \$155,000 for a high school graduate, and only \$110,000 for those who have completed the eighth grade (Figure 22.3).<sup>24</sup> There is a need for more research on this subject so that an adequate assessment can be made of the possible total effects of increasing the educational level in the South on national income and economic growth. For example, the proportion of the population, ages 25 to 29 in 1950, that had completed high school was 35 percent for the United States, while only 25 percent or less had completed high school in each of the southern regions (Table 22.5). The low percentage of people completing high school in the southern region is not entirely due to the low percentage associated with the nonwhite population. The proportion of the white population graduating from high school in the South is consistently lower than for all other regions in the United States (37 percent for the United States and 28 percent or less for the southern regions). Increasing the educational attainment of the southern population would improve the quality of the labor force and affect regional economic growth. Such an effort would not only raise the income level of individuals in the South, but it would also enable underemployed labor resources to make a greater contribution to our total national product.

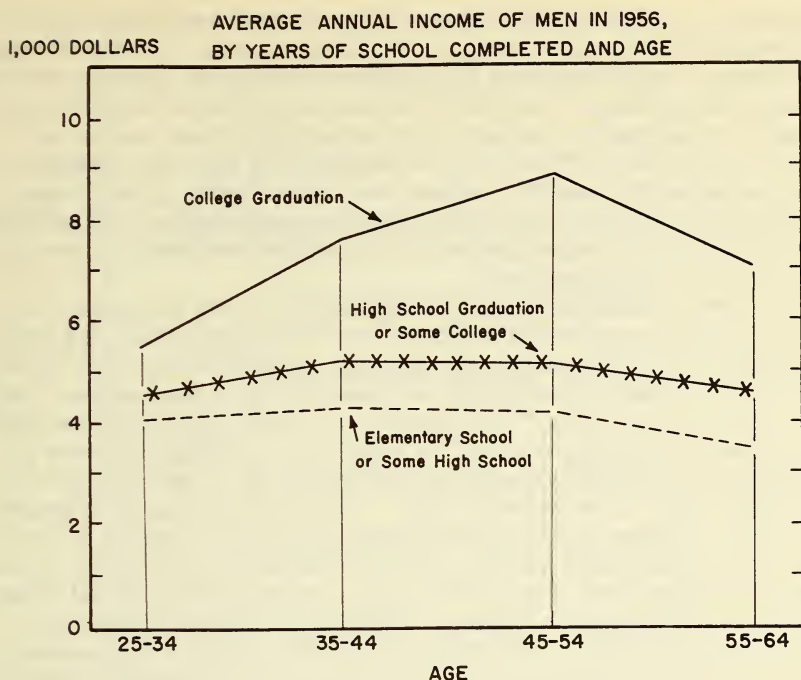
Another aspect of a long-run investment in human resources, such as education, is related to the relationship of basic education to

<sup>21</sup> USDA, Farm Population — Migration To and From Farms, 1920-1954, USDA, AMS-10, Dec., 1954; Gladys K. Bowles, "Farm population net migration from rural farm population, 1940-50," USDA, AMS, Stat. Bul. No. 176, June, 1956; C. Horace Hamilton, "Educational selectivity of rural-urban migration: preliminary results of a North Carolina study," Selected Studies of Migration Since World War II, New York: Milbank Memorial Fund, 1957 Annual Conf. Proc., pp. 110-22; also see *fn.* 15, this chapter.

<sup>22</sup> Herman P. Miller, *Income of the American People*, John Wiley & Sons, Inc., New York, 1955, p. 54, Table 25.

<sup>23</sup> Stuart Garfenkle, "Work-life patterns and educational levels," *Occupational Outlook Quarterly*, Vol. 2, No. 4, Dec., 1958, pp. 16-18.

<sup>24</sup> *Ibid.*, p. 16.



Source: U. S. Bureau of the Census, U. S. Dept. of Labor, BLS.

Fig. 22.3. Education is one of the factors affecting income.

subsequent training of individuals to acquire new or additional skills and competence. This built-in flexibility of the labor force enables industry to make short-run investments in training programs for individuals when technological advances alter the labor requirements of industry. Thus, the ability to alter specialized skills of our labor force to meet short-run changes in the demand for labor is directly related to the initial investments in human resources.

The need for a greater investment in human resources is being recognized by private industry. Many large corporations are initiating "continuing educational programs" for their personnel to improve the competence and skills of their labor force to meet the particular demands brought about by technological change. The need for this type of investment grew out of practical necessity for meeting current industrial demands for particular skills and for meeting future manpower needs that emerge from continuous technological progress and entrance of new workers into the labor force.

Another opportunity for increasing the investment in human resources is the improvement of existing educational programs by expanding certain program activities, such as vocational guidance and training, while leaving other activities, such as vocational agriculture, at their present levels. Still another possibility would be a reallocation



of funds, i.e., reducing expenditures for vocational agriculture and increasing expenditures for program activities such as "vocational trade and industry" and "vocational distributive occupations" training for the young adult population. In addition to similar vocational training and guidance programs for the rural adult population, other programs could be expanded, such as extended employment services unemployment compensation benefits, outlook services to better inform farm people about both farm and nonfarm income opportunities, and improved agricultural education programs for scientifically-minded farmers as well as low-income farmers.<sup>25</sup>

The above suggestions should lead to an improved investment in human resources and would, in effect, bring our educational and training efforts in line with needs and demands. In fact, the demand for vocational agricultural training has decreased more in the southern states than it has for the nation.<sup>26</sup> The proportion of farm youths of the male farm population in 1950 enrolled in vocational agriculture classes in twelve southern states was only 35 percent, while 41 percent were so enrolled for the United States in 1950. The fact that a smaller proportion of farm youths enrolled in vocational agriculture classes in the South than elsewhere, considering the preponderance of farming in the South, could mean that these youths have recognized the limited opportunities in agriculture to a greater extent than have our educational policymakers. In fact, many of the educational studies have assumed that vocational training for full-time agricultural occupations should be expanded. Insufficient thought has been given to (1) the limited opportunities for employment in agriculture, and (2) the relationship of agricultural employment to continued economic growth and improved farm technology.<sup>27</sup>

Trends toward the need for even fewer human resources in agriculture would signal the need for a reallocation of the federal and state expenditures (as shown in Table 22.6) between vocational agriculture and vocational trade and industry training. Specifically, the funds for vocational agriculture and home economics probably should be reduced and reallocated to vocational trade and industry and vocational distributive occupational training. These data indicate that a critical review of our present manner of investment in human resource development should be undertaken and adjustments made in the use of current public funds before attempts toward improvement by additional funds are explored.

The slowness of our nation to fully appraise the benefits of making additional investments in human resources is closely related to historical concepts and attitudes concerning the role of education. In the past our economic system was less complex and technical, and

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<sup>25</sup> For a more detailed discussion on these points, see: Heady, *op. cit.*, pp. 119-27; Baum and Heady, *op. cit.*; Mackie and Baum, *op. cit.*

<sup>26</sup> USDA, Development of Agriculture's Human Resources -- A Report on Problems of Low-Income Farmers, *op. cit.*, pp. 34-37.

<sup>27</sup> USDA, *ibid.*, p. 34.



Table 22.6. Expenditures for Vocational Training for the United States and Low-Income Southern States, Fiscal Year Ending June 30, 1953

State	Total expenditures (\$1000)	Federal expenditures (percent)	Vocational			
			Agriculture (percent)	Home economics (percent)	Trades and industry (percent)	Distributive occupations (percent)
Total United States	145,951	17.4	32.5	29.5	34.6	3.3
Total Low-income southern states	39,864	18.5	45.3	34.7	17.2	2.8
Alabama	3,101	21.6	42.8	30.4	24.0	2.8
Arkansas	2,705	18.2	47.7	39.0	10.7	2.5
Georgia	5,052	14.3	45.9	39.6	11.7	2.8
Kentucky	2,190	31.1	47.0	33.3	17.5	2.2
Louisiana	3,748	13.1	45.3	37.9	14.0	2.9
Mississippi	2,900	21.2	49.5	34.9	13.7	1.9
Missouri	3,145	22.1	36.5	32.5	26.0	5.0
North Carolina	5,278	18.2	51.6	35.4	10.7	2.3
Oklahoma	3,612	12.2	50.9	27.8	18.1	3.2
South Carolina	2,895	17.0	45.7	34.2	17.4	2.6
Tennessee	3,536	20.2	39.9	36.0	21.7	2.3
West Virginia	1,702	24.3	31.1	29.9	36.4	2.5

Source: Digest of Annual Reports of State Boards for Vocational Education to the Office of Education, Division of Vocational Education, U. S. Dept. of Health, Education, and Welfare, June 30, 1953.

therefore, placed less emphasis on education than is true today. The importance of education in a society of increasing complexity cannot be overemphasized. In order to help bring about a rapid and more complete recognition of the importance of increasing our investment in human resources, greater research efforts will have to be undertaken. There is a real need for a greater research effort to develop appropriate investment criteria for human resource development and to provide more information on the basic relationships between physical and human resource development and economic growth. The need for a greater investment in human resources may become more important in the future than physical resource development since the extent to which the latter can be accomplished may depend upon the skills and imagination developed through investments in human resources. The results from such research efforts are needed to provide the basis for changing society's attitude toward investments in human resources, as well as criteria for increasing capital investment through program improvements.



# Discussion

THOMAS J. WHATLEY\*

Mackie gives top priority to a larger allocation of our national wealth toward a formal educational program which will provide an opportunity for the farm or rural youth of America at least to complete high school. Data presented indicate a positive relationship between formal educational attainment of individuals and their earning power. It is generally recognized that our formal educational system provides basic training upon which further specialized skills can be developed through in-service training in different occupations.

The Southeast is characterized as a region with low expenditures per pupil for secondary and primary education. Mackie indicates that during 1953-54 almost 53 percent of the young men screened for military service in the Southeast were either rejected for service or were found unacceptable for advanced training because of their low intellectual achievement. If additional capital investments in formal education will prepare the youth of the region with greater skills for agricultural, industrial, and governmental pursuits, why has education not received more emphasis? Perhaps the reasons are manifold. For example, an examination of the data presented in Chapter 22 shows that 45 percent of those employed in the Southeast were engaged in agriculture in 1940. This means that a large share of the burden of rearing and educating children now entering our labor force rests on a segment of the economy in the Southeast where capital resources are limited and incomes are low. As late as 1959, the average net cash farm income per farm in Tennessee was only \$1,504.<sup>1</sup> Long and Dorner estimated in 1949 that the average contribution toward rearing and educating farm children up to the age of 15 years by a farm family in Tennessee having less than \$1,250 annual net income was \$3,134.<sup>2</sup> The capital resources invested in rearing and educating two children amounted to approximately one-half the total investment available on an average Tennessee farm. It is easy to see why the farm sector in the Southeast has been faced with a definite limitation on its contribution toward education, especially since 1930 or 1940.

Elective administrative officials have found themselves in somewhat of a dilemma in trying to allocate scarce tax dollars among education, other public services, and physical resource development in areas where outmigration has been the highest — such as many areas of the Southeast. In order to keep or attract people and/or industries to

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<sup>1</sup> The Farm Income Situation, AMS, USDA, Washington, D. C., Feb., 1960, p. 21.

<sup>2</sup> E. J. Long and P. Dorner, "Excess farm population and the loss of agricultural capital," *Land Econ.*, Vol. 30, Nov., 1954, pp. 363-68.

communities, it is essential to provide roads, libraries, sanitation and recreational facilities, and many other services found in other areas where alternative employment opportunities exist. These items are often provided in lieu of increased investments in education. From a national viewpoint, the marginal productivity of these tax dollars may be higher if invested in education; however, from the standpoint of local groups providing the tax dollars and faced with area stagnation, the alternative uses for capital may result in less emphasis on education. Therefore, there is a definite need for further studies on ways to strengthen our formal educational program.

Vocational training and guidance programs should also be expanded to implement the movement of surplus young adults out of agriculture. Many of us are prone to look at our current farm population and state that we are faced with a tremendous job in shifting perhaps 50 percent or more of our current farm operators out of agriculture into industry, especially in the Southeast region. Henderson found in a study of adjustment potentials of 506 rural households in 8 counties in upper east Tennessee that 59 percent of the household heads were limited, due to age, physical handicap, or other similar factors, as to the adjustment they could make either in agriculture or toward industrial employment.<sup>3</sup>

Improved agricultural education programs must be provided for the adult farm population remaining in agriculture if our resources are to be used wisely and efficiently. Such programs must place emphasis on developing and blending the proper mixture of managerial know-how, labor with acquired skills, land, and other forms of capital into a complex business-oriented agriculture. The problem of keeping the proper mixture of resources yielding high incomes is difficult even in highly commercialized agriculture, but is compounded many times in areas such as the Southeast where many skills are undeveloped and physical resources are limited on existing farms.

More consideration should be given by both borrowers and lenders of capital to the returns which it will produce when mixed with other resources in a farming system. Agricultural education programs should provide farm operators with tools for decision-making, such as how to evaluate alternative farm enterprises and how these enterprises can be incorporated into alternative farming systems which maximize income and satisfaction. Technical assistance through expanded outlook information and farm and home planning by the Agricultural Extension Service plus the services furnished by the Production Credit Associations, Farmers Home Administration, agricultural bank representatives, professional farm management organizations, and other private and governmental agencies can be used to develop the human resources in agriculture.

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<sup>3</sup> H. A. Henderson, Resources and Incomes of Rural Upper East Tennessee People, Tenn. Agr. Exp. Sta. Bul. 312, Mar., 1960.

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## *Relationships Between Capital and Education*

**A**GRICULTURAL AND OTHER INDUSTRIES are developing and adopting innovations at a faster pace than ever before (cf. Chapters 1, 6, and 7). The process of adoption generally involves such steps as awareness, obtaining information, trial, and evaluation. In this process the farmer adopts a fraction of the total stock of innovations which can be expected to benefit him. Typically, he adopts only those innovations which reduce average, or per unit, costs.<sup>1</sup> These innovations may (1) increase output without proportionately increasing the quantity of each resource, such as in the case of hybrid corn; (2) substitute one resource for a scarce or expensive one, such as when machinery replaces labor; or (3) save one resource without materially changing use of other inputs or increasing yields; and (4) reduce risk and/or uncertainty. The aggregate effect of innovations has been to (1) reduce substantially the amount of labor needed in agriculture; (2) minimize the danger of land seriously limiting the production of sufficient food and fiber for our population for several decades; and (3) increase substantially capital requirements per farm. Data illustrating changes in capital requirements and use are presented in Chapters 1, 6, and 7.

While some innovations directly increase yield of agricultural products, the majority of other types are likely to increase total product supplies indirectly unless the resources saved are retired from agricultural production. Since a small increase in total supply causes a relatively large drop in price for most agricultural products, agricultural prices thus decline, giving society in general and consumers in particular the major benefit of an innovation.

Within agriculture the major income beneficiaries are those farmers who adopt the practice prior to general use and before the resulting increase in output and price decline. In this sense, nonadopters are likely to face lower farm incomes during the initial period of innovation adoption by other farmers. For example, the farmers in the Southeast who do not use any fertilizer would be able to obtain higher incomes if all farmers did not use fertilizer.

While the steady development and adoption of innovations benefit

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<sup>1</sup> Costs are defined broadly to include monetary and nonmonetary items.



society and make possible increases in economic growth, it also causes hardships for many farm families. Generally, those farmers with inadequate education, capital, or managerial abilities — or having a high aversion to risk or use of credit — are the ones who receive lower farm incomes. Discussions related to this point may be found in Chapters 4, 14, 21, and 22.

In addition to differential income effects on different groups of farms in the same area, different regions may also gain or lose from rapid technological progress. For example, the introduction of mechanization for cotton production has been more easily adopted by farmers in the Southwest than in the Southeast. Hence, farmers in the Southeast have been made comparatively, or even absolutely, worse off in income position. Perhaps the Southeast is also at a disadvantage because of the large number of farmers with inadequate resources and education to adopt readily new technologies in competition with other areas having fewer farmers with these handicaps.

#### ROLE OF EDUCATION IN DEVELOPING A DESIRABLE ENVIRONMENT FOR CAPITAL GROWTH

Numerous economists have indicated that physical quantities of land, labor, and capital are inadequate in explaining changes in agricultural output and development of agriculture. Schultz, referring to the decades of the 1930's, 1940's, and 1950's, indicated that increases in agricultural production have not been accompanied appreciably by increases in direct agricultural inputs.<sup>2</sup> Galbraith indicated that investment in capital is still a prime measure of progress, but it is an increasingly inadequate one.<sup>3</sup> Mackie stressed in Chapter 22 that progress depends more on quality rather than quantity of the capital equipment in use, and on the intelligence and skill of those who use it. Martin emphasized this point in Chapter 4.

If the failure to include quality of resources results in a limited insight and predictive ability concerning agricultural development, then it is appropriate to consider capital and credit problems within the broad framework of economic growth, as presented in Part I. If one considers quality of resources, including individuals, variables are introduced which are intangible and difficult or impossible to measure. One school of thought holds that since management cannot be defined, it is impossible to discuss this subject intelligently. The difficulty with this attitude is that it excludes from consideration many of the more important problems which confront us. Another school of thought holds that nothing can be done to guide or direct future adjustments in

<sup>2</sup> T. W. Schultz, *Reflections on Agricultural Production, Output and Supply in Fertilizer Innovations and Resource Use*, E. L. Baum, *et al.* (eds.), Iowa State University Press, Ames, Iowa, 1957.

<sup>3</sup> John Kenneth Galbraith, *The Affluent Society*, Houghton Mifflin Company, Boston, Mass., 1958.

agriculture and that one should leave things alone. This fatalistic attitude implies that man has no control over his economic affairs, and should also be discarded.

Research and education over the years have been an important basis for economic and cultural development. It is the medium by which we attempt to develop and make full use of the intelligence and skills of individuals. Formal and informal education has had a great deal to do with changing basic attitudes concerning the degree to which we seek material advance, accept innovations, apply science to economic ends, and develop fundamental science. In short, it is one important force conditioning capital growth and development. Bohlen and Beal, Coutu and Lindsey, and Mackie have stressed this point in their discussions.

### Managerial Skill and Capital Growth

Generally capital is timid. It flows when production outcomes are relatively well known. Except when there is a chance of a large profit, such as in exploration for oil, it does not flow when risks are high or when the probability of different outcomes is unknown. Capital does not flow freely where individuals or industries have limited experience in handling borrowed funds, or where managerial ability is low.

Credit itself is not a limiting factor in the capital development of many farms in the Southeast. Banks and other credit agencies predominantly have the resources to extend credit where it is justified in terms of reasonable expectations of safety. In fact, the federal government has taken the lead with the establishment of public credit agencies to insure that credit facilities of different types are available. More detailed discussions of public credit agencies may be found in Chapters 11 and 17. While there are still problems in providing credit tailored to the needs of agriculture, the major difficulty is in improving managerial proficiency and in changing attitudes so that more farmers are in a position to use credit. This point is developed more fully by Diesslin, Engberg, and Hopkin (Chapters 13, 15, and 16).

The small-scale southeastern farmer of 1950 had few opportunities to develop managerial skills. He may have borrowed funds to pay for the farm. Yet, success was considered to be associated with repaying the loan as rapidly as possible, and not borrowing except in dire need. He was considered successful if he developed the technical skills required to raise row crops and pay off his mortgage.

Today, success is associated to a much greater extent with the appropriate handling of purchased inputs, a larger size of farm, and a larger stock of capital goods. Frequently this means continuous use of credit, not only for permanent improvements but for working capital as well. Frequently, it means a shift to unfamiliar livestock production systems if a satisfactory income is to be obtained. The ability of farm operators to respond to these rapidly changing economic conditions has been one of the major factors controlling agricultural development in the Southeast.

Mackie indicated that one of the factors influencing farmers' abilities to adjust to modern farming conditions is related to formal education deficiencies. It is likely that a large segment of the farmers with a fourth grade education or less have not developed powers of communication and analysis sufficient to serve them adequately under modern conditions. A study by McArthur and Saunders emphasizes the extent of educational deficiencies in the Coastal Plain Area of Georgia.<sup>4</sup> The results of their survey, conducted in 1957, indicated that about one-third of all farm operators had a fourth grade education or less (Table 23.1). For those farmers 55 years of age and over, 45 percent had a fourth grade education or less. The essential point is that we are still feeling the effects of educational decisions made by society and individuals thirty and forty years ago. In an economic setting where abilities of individuals are becoming more and more important in terms of capital and general economic development, we need to remind ourselves that educational decisions being made today by both society and individuals will affect the nation for several decades under conditions which will likely place greater economic necessity on increased individual development. A second point to consider is that many farmers have not had control over sufficient resources to develop skills in decision-making, risk-taking, and debt management necessary for successful farm operation under today's farming conditions.

### CREDIT AND EDUCATION FOR LOW-INCOME FARMERS

The existence of a large group of farm families with incomes considered less than desirable is not unique to agriculture. There are low-income families in both urban and rural areas. The problem is

Table 23.1. Education of Farm Operators in the Coastal Plain Area of Georgia, 1957

Age	Years of formal education			Total
	0-4	5-8	9 or more	
	(percent of farms)			
Under 34	13.9	36.1	50.0	100.0
35 to 54	31.0	41.5	27.5	100.0
55 and over	45.4	36.4	18.2	100.0
All farmers	33.9	39.0	27.1	100.0
U. S. farm operators (1950)	17.6	51.5	30.9	100.0

Source: McArthur and Saunders, Ga. Mimeo N. S. 74; and Farms and Farm People, U. S. Depts. of Commerce and Agriculture.

<sup>4</sup>W. C. McArthur and Fred B. Saunders, Resources and Incomes of Rural Families in the Coastal Plain Area of Georgia, Ga. Agr. Exp. Sta. (in cooperation with USDA), Mimeo-graph Series N. S. 74, April, 1959.



important, regardless of whether it has a rural or urban setting, since (1) many of these individuals are contributing less to society than they might; (2) in many cases the children of these families are denied opportunities to develop skills, and are generally handicapped in competing with others who have greater opportunities for such development; (3) from a welfare standpoint, there is a general feeling that these people have been left stranded in our society; and (4) it is sometimes stated that this group could be a source of expanded markets for products. This subject is of direct concern to the Southeast since the majority of the low-income families of the nation are concentrated in the rural areas of the region.

Society has a welfare obligation to these people. Given limited resources for solving the low-income problem, however, there may be a conflict between welfare and economic growth objectives. The first consideration of society should be to insure that the children of these families have the opportunities to develop skills and intellect that would enable them to compete successfully for jobs and income in non-agricultural sectors. Such public activities as improved education, 4-H clubs, FFA, and vocational education are basic forces working toward minimizing the low-income problem in future generations.

Considerable progress has been made in determining the characteristics of the low-income problem. Experience and research suggest that the solution is complex (cf. Chapter 14). Since the causes differ from case to case, the solution varies by individuals or groups of families. For some, a single cause such as lack of capital, lack of education, social values, or health may be responsible. For many other families there is a complex set of causes. For example, a research study in northeast Texas<sup>5</sup> indicated that 77 percent of all farm families with incomes below \$1,000 had a family head who was 65 years of age or over, had a physical handicap, was female, or had completed less than five grades of school. Largely as a result of nonfarm employment opportunities, there were few able-bodied workers under 45 years of age with high school education engaged in full-time farming in the area. While variations exist among areas, the same general conclusions apply to much of the Southeast.

Traditional education programs designed to increase the physical efficiency of agriculture cannot be expected to solve the low-income problem. In terms of bringing about changes in farm structure and production techniques, much higher returns per educational dollar can generally be obtained by working with the operator of a large commercial farm. In fact, greater progress in solving the low-income problem has probably been made by programs which have not been specifically designed for agriculture. Progress in improving formal education, the development of better roads, and the wide availability of television and radio have all helped to reduce the isolation of low-income farm

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<sup>5</sup> John H. Southern and W. E. Hendrix, *Incomes of Rural Families in Northeast Texas*, Texas Agr. Exp. Sta. Bul. 940, 1959.

families from the general stream of economic and cultural activities. In spite of progress, much still has to be learned in terms of initiating successful action programs. Experience suggests that (1) the social cost of underdeveloped human resources is high, and (2) the problem does not disappear by ignoring it.

Some of the low-income problems in rural areas can be alleviated through adjustments in farm organizations. This possibility exists for the farm operators who have potential managerial ability, but need stimulation and/or managerial, educational, and credit assistance. This group includes operators who have been successful but are now receiving low incomes because they have failed to make adjustments in their farm operations as conditions have changed. It does not include that segment of low-income farmers who are severely handicapped by age, health, or deficiencies in education or ability. Also, it does not include those farm operators who after careful evaluation of the circumstances decide that they would be better off with nonfarm jobs.

One possibility for the group of low-income farm families who are likely to remain in agriculture is the provision for intensive management assistance.<sup>6</sup> It would appear that financial and managerial assistance for basic and long-term farm adjustments would provide limited returns for those with severe capital, managerial, and physical handicaps. One would expect some improvement in the situation by attempting to provide managerial and credit assistance for adjustments in the farm organization which are more of an intermediate or short-term nature. One example of this is the establishment of small manufacturing milk enterprises near a cheese plant in northwest Georgia. The plant furnished managerial assistance, and local banks have cooperated with credit. This development has made it possible for some low-income families with various degrees of handicaps to obtain credit, technical, and managerial assistance so as to gain somewhat in income status and in the development of skills. Hopkin developed a similar case for private banks to extend such assistance in Chapter 16.

The Farmers Home Administration provides experience in helping small commercial farmers. Managerial assistance provided along with credit has made it possible to extend credit where it otherwise would have involved excessive risk. It is doubtful, however, that the program could be extended successfully to farms with greater handicaps. In Chapter 14, Hendrix and Lanham pointed out that for many of the lower-income families currently served, living expenses are too near income levels to provide much leeway for retiring debt obligations.

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<sup>6</sup> A. B. Mackie and E. L. Baum, Problems and Suggested Programs for Low-Income Farmers, T 60-2 AE, TVA, Knoxville, Tenn., Oct., 1959.

## COORDINATION OF CREDIT AND EDUCATION FOR COMMERCIAL FARMERS

Increased agricultural efficiency and regional agricultural development may also be fostered through greater coordination between educational programs and credit institutions in agriculture. This possibility needs thorough examination.

The need for tying technical assistance to credit is less vital for commercial farmers than for low-income farmers. Also, the type of coordination needs to be different. However, bankers in rural areas have far-reaching opportunities to be educators as well as dispensers of credit. Many rural bankers serve a very important function as advisers to farmers, particularly for broad aspects of management such as farm enlargement or enterprise changes. Many commercial banks are hiring agricultural agents or farm management specialists. This development is discussed by Shepardson and Hopkin (Chapters 16 and 18). This is a promising method of extending credit in situations where limited management assistance is needed to insure safety of the funds. It can also be an important link for coordinating educational and credit assistance for intensive public educational programs such as Farm and Home Development and Rural Development.

Education has an important role in bringing about changes in attitudes and institutions which limit capital development. For example, greater educational efforts are needed to encourage desirable leasing arrangements and eliminate the social stigma attached to renters. The development of more flexible leasing arrangements would be one way for farm operators to obtain control over additional capital or management (cf. Chapter 9). The possibility of obtaining capital and management for someone willing to share the risks could contribute to the capital structure of southeastern agriculture and provide a stronger base for extending larger quantities of credit.

Educational programs for farmers have traditionally emphasized production know-how. Insufficient attention has been given to providing principles to improve decision-making abilities with respect to resource allocation and use. Given a long-term objective of enhancing southern agriculture, it is extremely doubtful if educational resources spent in promoting a particular action by farmers can be nearly as efficient as efforts to develop the managerial capacity of farmers.

## COMPLEMENTARITY BETWEEN EDUCATION AND CREDIT

Education and capital can be considered to be technical complements in agricultural production. Except within a narrow range, benefits cannot be obtained from one without increasing the other. In this sense, and if one thinks of an agriculture in the 1960's where substantially higher levels of capital are used per farm, then it follows that substantial improvements in managerial proficiency are also needed.



The adequacy of present educational programs and their coordination with credit programs and needs should be considered. Our propensity to adopt changes in institutions, programs, and laws is considerably lower than the propensity of farmers to adopt new biological or mechanical innovations. At any rate, changes in the organization, methods, and objectives of educational undertakings occur slowly.

In the 1960's it will be necessary to "lead out" with new approaches in applied research and adult education for farmers. There will be fewer but better trained farm operators. Research and education of higher quality will be needed.

## *Discussion*

### PAUL L. HOLM\*

Woodworth and Fanning suggest that credit, or the lack thereof, has not been a limiting factor in the development of the Southeast, but that the main difficulty has been the level of managerial proficiency and the attitude of farmers toward the use of credit. They note that the small-scale southeastern farmer of 1950 had few opportunities to develop managerial skills. He did not borrow money except in dire need.

I would add here that this was true of the small southeastern farmer not only in 1950 but also in 1960. One example is found in a study of farmers' attitudes toward credit which was conducted in a southeastern state in 1957. The results indicated that a small but significant proportion of farmers believe that borrowing money is an undesirable practice. A number of respondents said they believed that sometimes, at least, borrowers were looked down upon by their neighbors. To many farmers, the act of getting a mortgage was the same as losing the farm. In addition, many farmers believed that a farmer who could get along without borrowing was a better manager than the man who did borrow.

Another study pertinent to this area of financial management was conducted in South Carolina. The summary of the report on the study contained the following: "Inadequate education and training often restrict managerial capacity which is reflected in pessimism and conservatism toward technological change in agriculture. It also retards and restrains farmers from developing alternative uses for surplus agricultural resources, particularly labor. There is apparent need for broadening the base of training programs and expanding and improving the dissemination of information. The lack of adequate information and

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training in financial management appears to be especially acute."<sup>1</sup> In order to overcome these deficiencies, increased emphasis needs to be placed on the kind of education that develops the individual's power to communicate and analyze situations, as opposed to the emphasis on specific techniques designed to improve a single operation.

I doubt that anyone could disagree with the authors' statement that education is basic to progress toward a long-term solution of the low-income farm problem. However, more attention needs to be given to the subject matter and direction of such education. Perhaps the first objective of this kind of education is to acquaint the individuals involved with their level of economic activity relative to other segments of society and with the relevant alternatives available to them as individuals. The next objective, or perhaps a subheading of the first, is to insure that the individuals have the necessary powers of communication and tools of analysis to make an intelligent choice among the relevant and available courses of action. Successful accomplishment of the latter requires knowledge of the decision-making process and of the elements in the process that need to be emphasized in an educational program designed to facilitate the process.

I find it inconsistent in our own society for anyone but the individual involved to make the final choice of his course of action. If, however, society in some way forces a decision upon the individual, it must stand ready to assist him in carrying it through to completion. It is here that education finds a final objective. This objective is to equip the individual in such a way that he can successfully accomplish the ends he has chosen or that may have been chosen for him.

#### ROBERT A. DARR\*

Woodworth and Fanning's statement that education, both formal and practical, to improve decision-making abilities, risk evaluations, and credit management, is of great importance. I propose that college research workers, in cooperation with commercial banks, farm credit banks and associations, and other farm credit agencies develop actual cases which could be written up, studied by students and adult farmers, then discussed and used as a tool to improve decision-making abilities and techniques. The effectiveness of case method studies has been demonstrated by several schools of business administration, and it is my opinion that there is a wealth of information which could be developed on cases which were successful, as well as on cases which were not successful. Such cases should include resources, financial plans, marketing plans, profitability in relation to other alternatives, new enterprises, adjustments, enlargements, and the like. It is my opinion that people in credit institutions would be willing to assist in leading

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<sup>1</sup> Calvin C. Taylor and Thomas A. Barch, Personal and Environmental Obstacles to Production Adjustments on South Carolina Piedmont Area Farms, S. C. Agr. Exp. Sta. Bul. 466, 1958, p. 33.

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discussions with students and adult farmers under the case-method procedure, in addition to helping research workers develop cases which might be effectively used.

Education plays a vital role in the following ways:

1. In equipping individuals reared on farms to reach a decision as to whether to farm or pursue alternate opportunities in their best interest and thereby make a greater contribution to society.

2. In evaluating opportunities to maximize profits through new enterprises, adjustments, enlargement, or more efficient farm operations.

3. In the desire to seek borrowed capital, use it wisely, and develop sound long-range, as well as short-range, financial plans and arrangements. Too few farmers have good financial plans to present to their farm credit association or bank when they are requesting financing of an expansion, new enterprise, or adjusted operation.

4. In seeking to continue the learning process which is necessary to meet constantly changing conditions on the farm and in the economy.

Lenders, as well as borrowers, will need to be smarter in the future. Another proposal I would like to make is to challenge the agricultural colleges to give some of their students more training of the kind necessary for graduates to have to advance rapidly as credit men and managers of lending organizations. We constantly experience the problem of finding men who have a good understanding of the concepts and techniques of credit, and men who can evaluate a farmer's ability to cope with all of the phases of modern farming. We have a training program and are employing outstanding men, but I am of the opinion that they should be better equipped to assume leadership in farm credit business, and it would certainly be a contribution to them and to agriculture.



**PART V**

**Selected Research for Improving  
Use and Productivity of  
Capital and Credit**

- ▶ **Utility and Decision Processes**
- ▶ **Resource Productivity and Loan Limits**
- ▶ **Effects on Use of Production Factors**
- ▶ **Needed Research**



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## *Decision Processes for Understanding Capital Use and Investment on Farms<sup>1</sup>*

AFTER SOME REFLECTION on the problem of improving capital use, particularly on low-production and low-income farms of the South, the authors concluded that most conceptions of the demand for capital by individual farmers are inadequate. The conceptual developments in this chapter are intended to provide some logic of, and defense for, the following general propositions: (1) the explanation of capital rationing by an individual due solely to an aversion to risk arising from imperfect knowledge may be misleading;<sup>2</sup> (2) demand for capital by an individual farmer for investment in a production alternative is jointly determined by a number of dimensions of value; (3) potentially, capital rationing by individual farmers lessens as monetary relative to nonmonetary considerations increase in importance in individual valuations of production alternatives; and, (4) limited capital use by low-income farmers of the South is consistent with the presence of a complex of valuations other than monetary motives in individual appraisals of production alternatives.<sup>3</sup> Some elaboration of these propositions, together with their policy implications, will follow development of the concept of value-space as it applies in individual valuation of production alternatives and decision processes.<sup>4</sup>

### Utility and Decision Processes

Catton made the concept of value-space central in a theory of value and of valuing.<sup>5</sup> The main idea he advanced is that objects of desire are

<sup>1</sup>Journal manuscript No. 557, Okla. Agr. Exp. Sta. The authors are indebted to E. J. R. Booth, Clark Edwards, and Odell Walker of Oklahoma State University, to E. N. Castle of Oregon State College, to John M. Brewster of ARS, USDA, and to John R. Franzmann of the TVA, for their constructive criticisms and suggestions.

<sup>2</sup>Capital rationing refers to the unwillingness of the individual to invest as much capital in a production alternative as monetarily profitable for him.

<sup>3</sup>An alternative hypothesis is that lending policies by credit institutions, or limited capital available to the farmers, is the cause of limited capital use by these farmers. Cf. W. E. Hendrix, "Availability of capital and production innovations on low-income farms," Jour. Farm Econ., Vol. 33, No. 1, Feb., 1951, pp. 66-74.

<sup>4</sup>The ideas presented in this chapter may be interpreted as the development of a general structure for explaining nonprofit maximization by individual farmers.

<sup>5</sup>William R. Catton, Jr., "A theory of value," Amer. Soc. Rev., Vol. 24, No. 3, June, 1959, pp. 310-14.



valued by individuals in relation to many dimensions. For example, time is a dimension in that, *ceteris paribus*, individuals place a higher value on an object or income the nearer it is to the present. Also, geographical distance is a dimension because an individual values an object differently as its distance from present location of the individual differs. Other dimensions of a value-space mentioned by Catton were social distance, permanence probability, and free selectability.

Some of the dimensions of value identified by Catton may be interpreted as means or costs in the acquisition of objects of desire. Objects of desire may be interpreted as the consequences of actions. The value of an object of desire, or the consequences of actions per se, also must be represented by a dimension of a value-space. Catton did not suggest a scale or common measure of value on the *n*-dimensions of the value-space. Traditionally, in economics, money has been the index or measuring rod for both means and consequences of actions. Since profit maximization was implied by this measure, economists have made increasing application of utility theory in their speculations about decision processes.

The utility theory of economics underlying modern conceptions of demand dates back to the beginning of neoclassical economics. Developments in modern welfare economics, beginning with the utility theory in Hicks' *Value and Capital*, expanded the theory of utility applicable in individual decision processes. However, attention to problems of utility or values in models to explain production decisions did not arise until the recognition that lack of perfect knowledge made relevant value or utility rather than money profits.<sup>6</sup>

From a review of models of choice in economics, we draw the conclusion that ends other than monetary income, such as security, are related functionally to uncertainty, and such ends become irrelevant in advent of perfect knowledge.<sup>7</sup> However, nonmonetary values independent of uncertainty have received considerable discussion as having influence on individual behavior.<sup>8</sup> If there are nonmonetary dimensions of value, independent of uncertainty, relevant in individual business decisions, one runs the risk of overemphasizing lack of knowledge when using the models of rational choice to explain these decisions.

Another limitation of the models of choice, when applying the utility theory from consumption economics, is the under-emphasis on means. The orientation of these models is on the consequences of actions. If this evaluation of models of decision processes is correct, most of

<sup>6</sup> Statements in this chapter regarding the limitations of use of profit maximization as the sole end in economic analyses of individual farms are meant to apply mainly to low-production farms. Profit maximization may be a reasonable assumption in case of analysis of resource-use problems for high-income farmers.

<sup>7</sup> Cf. Gerhard Tintner, "A contribution to the non-static theory of production"; Oscar Lange, *et al.*, *Studies in Mathematical Economics and Econometrics*, University of Chicago Press, Chicago, Ill., 1941, pp. 92-109; and Albert G. Hart, *Anticipations, Uncertainty and Dynamic Planning*, Augustus M. Kelley, Inc., New York, 1951.

<sup>8</sup> Cf. John M. Brewster and Howard L. Parsons, "Can prices allocate resources in American agriculture," *Jour. Farm Econ.*, Vol. 28, No. 4, Nov., 1946, pp. 938-60.

these models need a reorientation, and we suggest that the concept of value-space, developed with the use of the theory of utility, may provide a way of emphasizing means and consequences in decision processes realistically.

### Dimensions of Economic Value

Value-space is multidimensional; the five dimensions we use to illustrate the multidimensionality of value-space for a production alternative are monetary income, degree of knowledge, time, effort, and capital requirements. Later illustrations are based on the following general functional forms:

$$(1) \quad U = U(\pi, Z_i), \text{ or, } U = g(\pi) + h(Z_i)$$

$$(2) \quad \pi = P_y Y - \sum_j^n P_j X_j \text{ (net monetary income)}$$

$$(3) \quad Y = f(X_j, Z_1, Z_2, \dots, Z_k)$$

where  $U$  is utility,  $\pi$  is expected monetary returns above monetary costs (net monetary income),  $Y$  is expected physical output, the  $X_j$ 's are expected quantities of the priced factors of production, and  $Z_i$ 's are nonpriced inputs, with  $k$  of these being functionally related to  $Y$ . In equation (1), the monetary and nonmonetary components of utility are separated. If  $h(Z_i) = 0$  for all  $Z_i$ , then:

$$(4) \quad U = g(\pi)$$

which means the economic value-space can be represented with a utility function for money.

Money as a dimension of value-space is not new in decision models; also, as expressed earlier, degree of knowledge has received a central place in decision models. Although time, effort, and capital—as nonpriced factors—have received attention in economics, such attention has been small, or nil, in decision models.<sup>9</sup> These dimensions, with the assumption that monetary income is independent of other dimensions of the value-space, will be examined below.<sup>10</sup> Thus, the emphasis will be on the nonmonetary dimensions. The relations to be discussed may be expressed, functionally, as follows (with specific symbols for some of the  $Z_i$ 's):

<sup>9</sup> For example, short-time horizons, leisure, asset position, desire for less uncertainty, etc., are discussed in the literature as possible explanations of inefficiency in resource use by individuals; however, conceptions of how these values, when considered simultaneously, fit in decision models do not exist.

<sup>10</sup> The assumption of independence of monetary income and the nonmonetary dimensions is made only for convenience. The actual situation may be expressed as follows:  $U(\pi; Z_i) = f(\pi, Z_j)$ , where  $j \leq n$ . For example, receipt of income influences knowledge, or, one learns by experience.

$$(5) \quad h(T; E, C, K) = p(T, K)$$

$$(6) \quad h(E; T, C, K) = q(E, K)$$

$$(7) \quad h(C; E, T, K) = r(C, T, K)$$

$$(8) \quad h(K; T, E, C) = s(K)$$

where  $T$  = expected time of receipt of an expected  $\pi$ ,  $E$  = expected effort required,  $C$  = expected capital required, and  $K$  = degree of belief, or knowledge, in receiving the expected  $\pi$ .<sup>11</sup> These functions may or may not properly account for interdependence of the dimensions. The major interaction we discuss is knowledge with all other dimensions.

The time dimension refers to a time preference in production or in the receipt of income, rather than in consumption, or in the expenditure of income. Although in economic literature these two kinds of time preferences are considered inseparable, time preference in production can be, and usually is, oriented toward the present regardless of the nature of time preference in consumption by an individual. This belief presupposes that future needs in consumption are uncertain. When considering the function  $p(T; K)$  (with  $K$  at a fixed level), utility is assumed to decrease with an increase in time at an increasing rate (Figure 24.1). However, if the time preference in consumption is oriented toward the present, as may well be the case for low-income farm families, then time preference in production must also be oriented toward the present. That is, time preference in production can be more oriented toward the present than time preference in consumption, but not

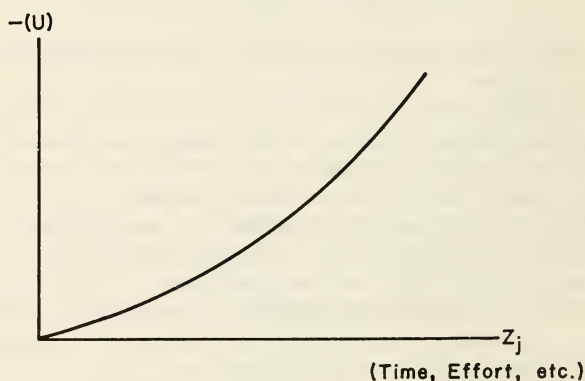


Fig. 24.1. Hypothesized relation of dimensions of value-space and utility.

<sup>11</sup> Note that the variables are in terms of expectations by the individual. Expected value is interpreted as the arithmetic mean of a subjective probability distribution. Since these expectations are not single-valued, the knowledge dimension ( $K$ ) relates to degree of risk or uncertainty.



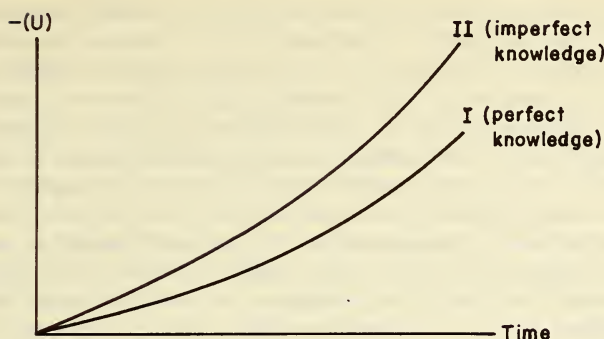


Fig. 24.2. Effect of levels of knowledge upon discounts for time.

less. A major reason for the postulated orientation of time preference in production toward the present is that the opportunities to decide how to allocate a given income for consumption over time (given uncertainty in future needs in consumption) become more restricted as the receipt of that income is more remote from the present. The functional relation of time and utility will shift with the changing level of knowledge. As the degree of knowledge decreases, the level of the function will shift as depicted in Figure 24.2 to represent additional discounting.

Effort—or its opposite, leisure—has received much notice as a contributing factor to the rural low-income problem of the South. The presupposition to such an argument is that southern farmers place higher values upon leisure than do their northern counterparts, and this unique value for leisure conflicts with monetary income-earning incentives. Regardless of the merit of this hypothesis, effort is a variable in valuing production alternatives for farmers of any income level. If there is increasing disutility associated with additional units of effort required for an alternative in action, as Figure 24.1 portrays, unrealistic results may be obtained from the accounting procedures used in farm management. When comparing alternatives with unequal requirements in effort, valuing family labor at no cost when underemployed or at a fixed wage rate gives greater advantage to the higher labor-using alternatives than placed upon such alternatives by farmers. That is, by the postulated increasing disutility for additional effort, a supply function for family labor that is sloping upward at an increasing rate is assumed. Also, as expressed by equation (6), the effort function is expected to change with change in the level of knowledge. This change in function may relate, in part, to preferences in productive activity referred to in the literature as enterprise preferences.

The cash costs associated with capital use are accounted for in the  $\pi$  of equation (1). However, there are nonpriced aspects of capital considered by individuals in valuation of production alternatives. Reduction in security associated with increased capital use is related to degree of knowledge. Also, there is discounting for additional capital use

in a production alternative for reduction in opportunity to invest in consumption until the capital is replenished by the realization of the consequences of action.<sup>12</sup> This discounting varies with the initial asset position, and it increases as time of realization of the consequences is more remote from the present. Such discounting on the capital dimension is distinguished from the discounting due to increase in time of receipt of income that is accounted for on the time dimension. A discount for worsening of the asset position, as viewed by the individual as capital investment increases from a given asset position, should be placed on the capital dimension. The additional discounting with less favorable initial asset position is a premise used in defense of the proposition that low-income farmers with unfavorable asset positions must discount the future much more than high-income farmers because of the additional pressure of current consumption on resources. This may be true. However, as indicated earlier, such a situation does not explain the preference for the present in the receipt of income.

The knowledge dimension, relating to desire for certainty, excludes interdependent effects of knowledge with other dimensions of the value-space. However, in the concepts used here, the various economic values, the discounting due to lack of knowledge, and the discounting due to attitudes independent of uncertainty are distinguished. With perfect knowledge there would be discounting with increases in time, effort, or capital. Under conditions of imperfect knowledge, any additional discounting on these dimensions, as well as on the knowledge dimension, would be attributable to lack of knowledge. If an individual is unaware of an alternative in production, such lack of knowledge accounts for the complete lack of interest in it.

### Illustrations of Economic Value-Space

Equation (1) may be written more explicitly as:

$$(9) \quad U = g(\pi) - \sum b_i Z_i^n; i = 1, \dots, m; n > 1$$

since the utility of the nonpriced factors is negative and this disutility was postulated as increasing at an increasing rate. In order to present an intuitive image of the value-space concept graphically, with economic dimensions, we assume the function:

$$(10) \quad U = \alpha - T^2 - E^2 - C^2 - K^2$$

where  $\alpha$ ,  $T$ ,  $E$ ,  $C$ , and  $K$  are  $g(\pi)$ , time, effort, capital, and knowledge, respectively. To add to the simplicity of the illustrations, the interactions among the dimensions are ignored since this simplification does

<sup>12</sup> The cost in reference is a nonmonetary opportunity cost. Monetary opportunity costs for competing production alternatives are excluded as influential on the parameters of the value-space for particular alternatives in production.

not detract from the stated purposes. Utility is also assumed to be measurable, and  $\alpha = 36$  is used in order to make the arithmetic simple. Value-space is defined as a space of potential interest in  $n$ -dimensions, or more explicitly, the possible values of  $T$ ,  $E$ ,  $C$ , and  $K$  of equation (10) in which  $U > 0$ .<sup>13</sup> When  $U \leq 0$  for a production alternative, it is of "no interest" to the decision-maker, and when  $U > 0$ , the alternative has potential of being selected for action.

There is, of course, an infinite number of sets of values for the variables in equation (10) that can define the outer boundary of value-space. Since no more than a three-dimensional space can be illustrated graphically, with  $\alpha$  one of these dimensions, a method was improvised to view the relations of the five dimensions, simultaneously, by use of the four quadrants of a plane.

An illustration by use of a single quadrant first will be presented. In equation (10), assume that no nonpriced capital is required, and knowledge for the alternative is perfect. Then we have the following function to examine:

$$(11) \quad U = 36 - T^2 - E^2.$$

This function defines a utility surface. In Figure 24.3, equation (11) is plotted for  $U = 0$ . The possible values of effort and time consistent with  $U = 0$  is a contour on the utility surface. Utility of 36, the

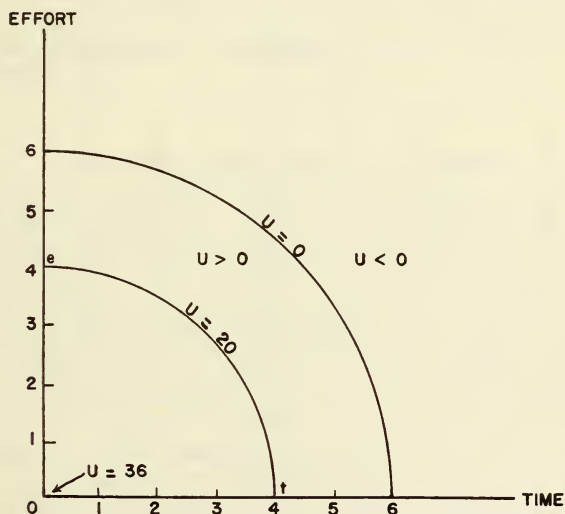


Fig. 24.3. Illustration of value-space for two dimensions.

<sup>13</sup> This definition of value-space may be consistent with the conception of an image as presented by Kenneth E. Boulding in *The Image*, University of Michigan Press, Ann Arbor, Mich., 1956.



maximum, is at the origin. Other contours or indifference curves, such as et in Figure 24.3, indicate substitution possibilities between effort and time for given levels of utility.

In order to expand this illustration, the other three quadrants of the plane were developed, each of which considers two of the four non-priced factors in production (Figure 24.4). The following functions are considered, in addition to equation (11):

$$(12) \quad U = 36 - E^2 - C^2 \text{ (upper left quadrant)}$$

$$(13) \quad U = 36 - C^2 - K^2 \text{ (lower left quadrant)}$$

$$(14) \quad U = 36 - K^2 - T^2 \text{ (lower right quadrant)}$$

The usual signs attached to the dimensions of the plane are ignored; that is, all are considered to be positive, with the exception of

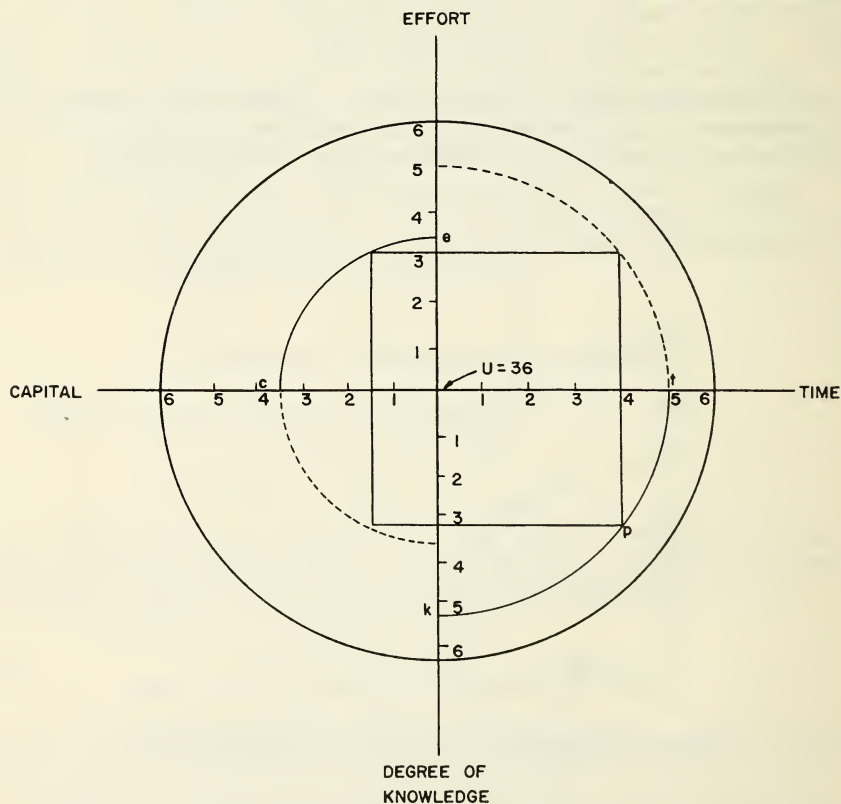


Fig. 24.4. Possible combinations of effort, time, knowledge, and capital for a value-space.

knowledge, which is assumed to be perfect at the origin (zero), and imperfections in knowledge are indicated by negative numbers. An increasing distance from the origin on any dimension reduces the net utility. The particular functions and scale selected for each dimension result in quarter circles for utility contours in each quadrant or, when joined, are circles in the plane.

If the values are fixed for two of the dimensions for a production alternative, the outer boundary of interest can be determined in terms of combinations of values for the other two dimensions. For example, in Figure 24.4 if degree of knowledge is at  $-3$  and time of realization of consequences is at  $4$ , the locus of these points,  $P$ , is on a utility contour  $tk$  for  $U = 11$  when effort and capital are at zero. The 11 units of utility must be reduced to zero by effort and capital inputs in order to define the outer boundary of value-space. In this example, the contour  $ce$  defines the combinations of units of capital and effort which will just exhaust the 11 units of utility remaining after accounting for knowledge and time. If effort is fixed at three units, the maximum capital investment in the alternative is about one and one-half units. If more capital than this amount actually was required for the alternative, and requirements of other nonpriced inputs were as assumed, the individual would be unwilling to invest the required capital, and thus he could be described as rationing capital. In general, if a capital requirement for an alternative exceeds the outer limit of interest on the capital dimension, capital rationing by the individual is a possibility.<sup>14</sup> A possible set of values for the dimensions which will satisfy the condition  $U = 0$  was defined above. An infinite number of such sets could be similarly defined.

### Value-Space and Demand for Capital

The illustration of the value-space concept demonstrates that interest or noninterest in production alternatives by farmers, or the intensity thereof, is jointly determined by several dimensions of value. Values in respect to capital use are among these dimensions. The individual's demand for capital for a production alternative, expressed as a maximum amount he (potentially) is willing to invest, may be some determinate amount as illustrated in Figure 24.4. But before such a determination could be made, values for other dimensions of the space had to be assumed. Thus, we conclude that demand for capital by an individual for a production alternative is jointly determined by all the dimensions of value-space, and, therefore, the explanation of limited demand for capital for production alternatives by low-income farmers attributable to unique values in respect to capital use must be

<sup>14</sup>Also, external credit rationing, or restrictions on capital loaned to an individual, exists when the individual is unable to obtain from credit agencies the capital for a requirement within the boundary of potential interest.

misleading. Such attitudes about capital use contribute to the degree of willingness of an individual to invest capital in a production alternative; however, it is possible that such a nonpriced factor as family labor (effort) may be contributing more to limited demand for capital than attitudes about capital use. Alternatively, it is also possible that an apparent high degree of preference for leisure can be explained by the nonpriced factors other than effort.

A general function to express what determines willingness to invest capital in a production alternative, in terms of variables in our illustration, is as follows:

$$(15) \quad Q_C = f(\alpha; Q_E, Q_T, Q_K; U'_E, U'_T, U'_K, U'_C)$$

where  $Q_C$ ,  $Q_E$ ,  $Q_T$ , and  $Q_K$  are quantities of capital, effort, time, and knowledge, respectively, and  $U_i$ 's are the marginal utilities for these quantities. If we wished to make  $Q_C$  very large, or at any value consistent with  $\alpha$ , we would decrease quantities of nonpriced factors and the parameters of disutility therefor. This substitution relation is basic to the value-space concept. Therefore, we conclude that (potentially) capital rationing by individual farmers lessens as monetary relative to nonmonetary considerations increase in importance in individual valuations of production alternatives (third proposition in introduction). The limited capital use by low-income farmers of the South is consistent with the hypothesized presence of a complex of valuations other than monetary motives (fourth proposition in introduction).

### Value-Space and Decision Processes

Each alternative in production has a unique value-space, or space of potential interest, to an individual producer. Although we cannot say that all alternatives in action with potential interest to an individual do actually enter into his behavior, we conclude that any alternative in action outside the boundaries of interest ( $U \leq 0$ ) will be excluded. Some alternatives within the bounds of potential interest will be excluded by other alternatives in action. The concept of value-space does not constitute, of course, an adequate theory of choice. However, it may form a major part of such a theory.

Two possible approaches in adding to the concept to develop a theory of choice would relate to two assumptions about motivation: (1) an individual is motivated, continuously, to achieve a maximum utility by his activity; and (2) an individual is motivated toward higher utility positions only in occasional periods when dissatisfaction with current achievement occurs. The latter assumption is associated with the level of aspiration and principle of bounded rationality concepts advanced by Herbert Simon.<sup>15</sup> The first of these two approaches to a theory of

<sup>15</sup>Herbert A. Simon, *Models of Man*, John Wiley & Sons, Inc., New York, 1947, pp. 196-206 and 241-60.



choice could be inconsistent with profit maximization motives as an assumption underlying much of economics, and the second approach is inconsistent with that assumption. Either could be consistent with the very wide gap between the resource use position of low-income farmers and the position in resource use consistent with maximum economic efficiency. For example, if low-income farmers are maximizing utility, their actions consistent with continued receipt of low income could be explained by some major nonmonetary considerations in the valuation of production alternatives. Such nonmonetary considerations could explain why low-income farmers limit the use of capital or lag in adopting technical innovations. If such alternatives are within the boundary of potential interest to an individual farmer, yet he fails to include them in his actions, then they are being excluded by greater interest in low-income-yielding actions.

The approach taken by Simon could be used to suggest that individual farmers are motivated by income goals or targets rather than by optima, and that these goals or targets fall considerably short of maximum utility or profit. Thus, a target just above current income levels would not produce the incentive necessary for making major changes in current activities. When motivation by an individual is sufficient to produce activity in search of higher incomes, a search for an appropriate alternative or alternatives for the purpose first gets under way, and the extent of such searching—or learning—depends upon his success in finding acceptable courses of action. If the searching is unsuccessful, the aspiration level, or target, must adjust to the potentialities of the environment to the individual. Whether or not this conception of behavior is realistic, the idea of using income targets in farm management analyses of low-income farms may have merit (cf. Coutu and Lindsey's discussion in Chapter 21). Such targets chosen for the analysis could provide sets of adjustment alternatives representing improvements in resource use, although not necessarily the maximum efficiency in resource use. The merit of this approach is that few low-income farmers could be expected to adjust immediately to maximum economic efficiency following publication of instructions on how this can be done; they more likely will accept research results representing less change in present resource use. This approach in analysis may be extended to provide a step-by-step process in farm resource use adjustments on low-income farms, as suggested by Woodworth and Fanning in Chapter 23.

### Improving Capital Use and Investment Decisions

"... Political Economy does not of itself instruct how to make a nation rich; but whoever would be qualified to judge of the means of making a nation rich, must first be a political economist."<sup>16</sup>

<sup>16</sup> Essays on Some Unsettled Questions of Political Economy, London School of Economics and Political Science, Reprint of Scarce Works in Political Economy, No. 7, Essay V, 1948, p. 124.

The preceding analysis does not of itself provide us with sufficient means for prescribing how to improve capital use and investment decisions on individual farms; however, some statements of policy, or judgments, are expected even if they are based upon a scanty bit of logic and fact.

The main conclusion drawn from the above analysis is that monetary motives must increase relative to nonmonetary valuations if substantial increases in capital use are to be obtained on most farms in the South. Lack of knowledge is a major part of the complex of non-monetary valuations. Much improvement in capital use, therefore, could be expected from an effective educational program designed to influence the knowledge image of production alternatives (cf. Chapters 22 and 23). Other than a relentless attack on the knowledge problem, a program emphasizing the changing of people's values is not proposed here.<sup>17</sup> Such a proposal would involve major ethical judgments unnecessary for our purposes.

An idea proposed to the agricultural workers of the rural development committees in Oklahoma may have merit as a long-run attack on the problems associated with inefficient capital use on southern farms. The proposal suggests that attention be focused on developing a limited group of commercial farmers in these low-income counties rather than attempting to improve resource use on all farms at the same rate. Many low-income counties in the South are very limited in agricultural leadership at the farm level. Such leadership, if developed, could add to the incentives of other farmers to advance, as well as to provide "information centers" on productive activities. Candidates for the increased attention would be those with less value impediments to increasing production efficiency, and this suggests the younger families.

A dilemma encountered in such a proposal is that the younger families in low-income areas have a meager quantity of assets in relation to that required for development into an efficient farm enterprise. Also, the more capable of these young people migrate to income-earning opportunities in other industries and in other locations. The rural low-income problem in the South could be alleviated if the capable young people of the low-income areas could be established in farming in those areas with the resources necessary for adequate incomes.

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<sup>17</sup> Knowledge and values are functionally related, and therefore, changes in knowledge will be accompanied by changes in values. This approach to changing values of people does not imply the advocacy of a change to particular values.

# Discussion

## EDWARD M. NORMAN\*

Back and Hurt make an economic approach to the very complex attitudes and resources of our southeastern agriculture. They develop the the factors involved in decision-making and place them as nearly as possible into a mathematical relationship. This formula can never be fixed, but it does provide a basic outline of the factors involved in choosing courses of action.

The propositions in the chapter are worthy of simplification. They are as follows: (1) a farmer does not necessarily ration capital due solely to the risks involved or his aversion to debt; (2) there are many factors involved in a farmer's use of capital; (3) monetary considerations have more influence than nonmonetary considerations in decisions to apply capital; and (4) limited capital use by low-income farmers is determined by a complex of valuations other than monetary considerations.

The authors present two choices for improving capital use. They are (1) mass education, or (2) concentration on a few. The proposal is well taken that a select group of commercial farmers be developed who properly apply capital to its best use. Motivation will do the rest. If one barn is painted in a community, they are all painted. The reaction to profit-making courses of action are the same. The subtle, less expensive approach to mass education utilizes the natural competitive instincts in mankind to keep up with others. Such a program would also influence those associated with agriculture—bankers, warehousemen, processors, and dealers whose help is vitally necessary in developing and maintaining a healthy agricultural economy. This proposal is certainly worth our serious consideration.

## HAROLD G. WALKUP\*\*

Considering first the concept of the entrepreneur, it appears that Back and Hurt have considered his manifestation of utility too narrowly. Greater insight would be gained if the farmer entrepreneur were allowed to be focal in the farm-family utility-seeking; but his utility considerations would be more or less conditioned by the interpretation he places on utility-seeking by other members of his family for whom he makes ultimate investment and consumption decisions. The entrepreneur is also influenced by the social environment within which, and in

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relation to which, he perceives himself. His investment and consumption decisions are influenced also by the impact of social environmental factors on his family. Presumably, the effect varies inversely as the social distance increases and directly with the social pressures they represent. This more incisive modification contains major implications for consumption and investment decisions and suggests new considerations in the capital and credit complex.

A social investment variable should be included explicitly as a part of the utility function. Social investment, or the lack of it, provides an important environmental factor in which entrepreneurial utility arises. In many areas, particularly in low-income farm areas, social investment provides the largest opportunity to create utility at the margin of investment and consumption. But, the Back-Hurt function makes social investment alternatives show up as a disutility factor, as costs (taxes) which reduce net monetary returns.

What recommendations have Back and Hurt made in light of their value-space concept? They have tried, more or less, to fit low-income entrepreneurs into the existing capital and credit structure. The following suggestions are made to complement and supplement their proposals.

Through education, by demonstration and otherwise, low-income farmers may be inculcated with the monetary motive through the use of factors of production (such as fertilizer, improved seed, and agricultural chemicals) having a high marginal productivity and being short-term capital outlays. The reward would thereby be achieved within the more limited time in which they are accustomed to consider values.

A second proposal relates to the improvement of capital formation in the human factor. Failure to explicitly recognize social investment and its contribution to utility and the creation of human capital is a serious omission. This is important when one considers the practice concerning human capital formation through tax-supported public schools. The existence of the public school system and the requirement for attendance up to a certain age or grade is a recognition of the shortcomings of entrepreneurial assessment of human potential and of the inadequate functioning of the allocative principles in this vital area. The allocative principles do not work well because credit practice entails utilizing chattels which are not legally possible nor socially desirable in the area of human capital formation. Consider for a moment this question: Can we not innovate sufficiently in the area of human capital formation so that loans for education beyond the high school level can be made on commercially and socially satisfactory terms? This is an agricultural credit problem because it is within the farm firm and the farm family environment that much new human capital is formed and is gradually emancipated to its own utility focus.

C. B. BAKER  
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## *Estimating Productivity and Financing Limits for Resources<sup>1</sup>*

TWO AREAS of Illinois were chosen as the site of the study explained in this chapter. One is a cash-grain area in east central Illinois; the other is a livestock area in the west central part of the state.<sup>2</sup> The areas are outlined in the map shown in Figure 25.1. They are remarkably similar in agricultural production conditions. Thus, the large difference in the proportion of farms reported as cash-grain or livestock operations must be ascribed to factors other than production. Homogeneity between areas is important to some inter-area comparisons which will be made.

In 1958, 400 farmers in the cash-grain area cooperated with the University of Illinois in an account-keeping project. In the livestock area, 299 farmers cooperated in the same project. The distribution of account keepers, based on returns to capital and management for each area, is given in Table 25.1. Studies at the University of Illinois suggest that voluntary account-keeping cooperators tend to be selective among the entire population of commercial farms so as to exclude extremes at both ends of most distributions. In other respects they represent fairly well the population of commercial farms defined in similar terms.

Among all farmers characterized in Table 25.1, it was thought that borrowers would more likely be found among those at the relatively low levels of income than among those at relatively high levels of income. Furthermore, the financial condition of the low-income farmer makes the situation more sensitive to lender decisions at reasonably low loan levels. Accordingly, all subsequent analyses and estimates relate to farmers in each area who earned \$5,000 or less as returns to capital and management in 1958. This includes about one-third of the account keepers in each area.

<sup>1</sup>This research is conducted cooperatively by the University of Illinois and the Tennessee Valley Authority.

<sup>2</sup>A more complete description of the areas may be found in C. B. Baker, "Estimating the effects of loan decisions on farmers' use of fertilizer," Proceedings, Conference for Cooperators in the TVA Agricultural Economics Research Activities, Knoxville, Tenn., Mar. 24-26, 1959.

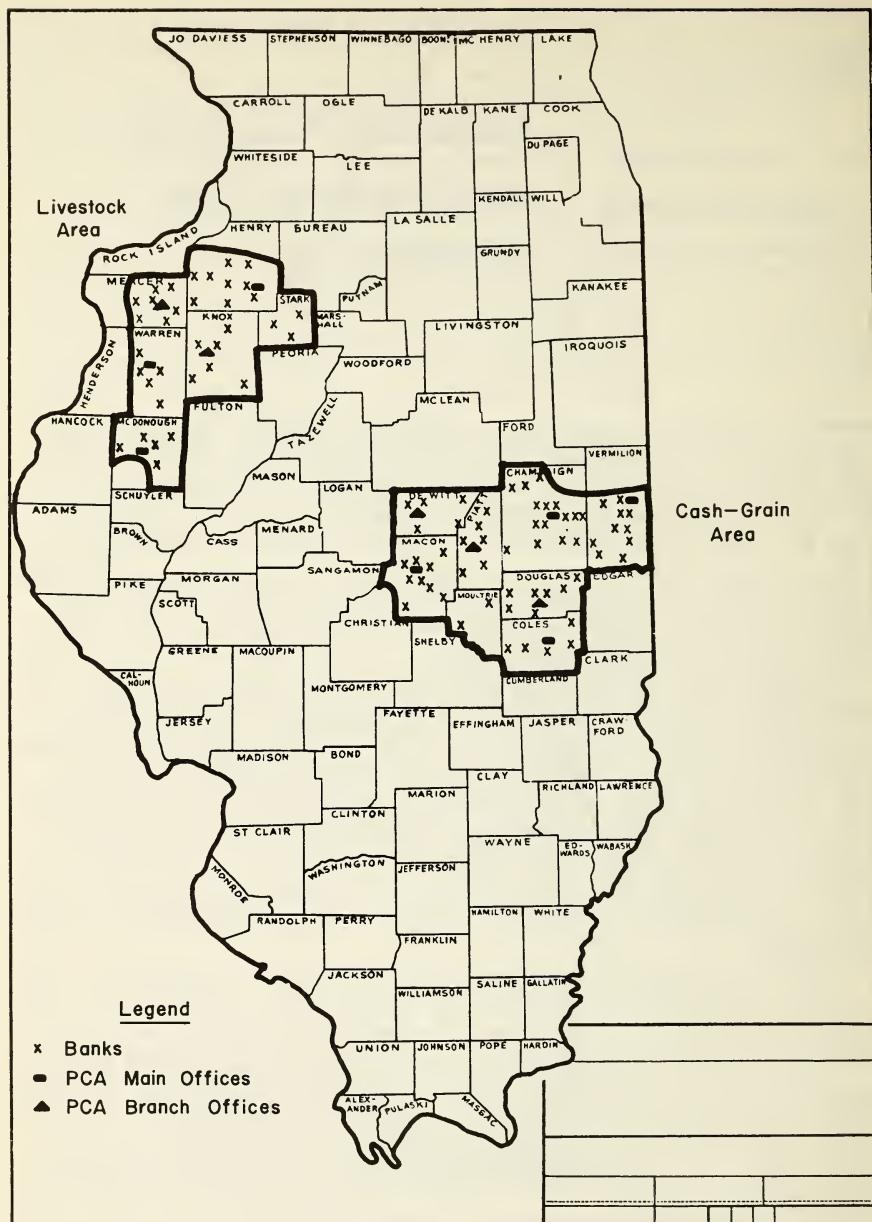


Fig. 25.1. Location of lending institutions (Illinois).



Table 25.1. Distribution of Cooperating Account-Keeping Farmers by Level of Income, East-Central (Cash-Grain Area) and West-Central (Livestock Area) Illinois, 1958

Returns to capital and management	Cash-grain area		Livestock area	
	Number	Percent of total	Number	Percent of total
Under \$0	22	5.5	8	2.7
0-2,500	45	11.2	33	11.0
2,501-5,000	73	18.3	45	15.1
5,001-7,500	72	18.0	57	19.1
7,501-10,000	74	18.5	42	14.0
10,001-15,000	67	16.8	62	20.7
15,001-20,000	29	7.2	29	9.7
Over 20,000	18	4.5	23	7.7
Total	400	100.0	299	100.0

### PRODUCTIVITY ESTIMATES

From records of the 140 farmers in the cash-grain area and from those of the 86 farmers in the livestock area, tabulations were made of the value of farm output and various categories of outlays resulting from their 1957 farming operations. Cobb-Douglas functions were fitted to these data. The result is a set of coefficients, each of which is an estimate for its respective factor, of the percent by which the value output would be increased by a 1 percent increase in the factor.<sup>3</sup>

Resource categories relevant to the research are listed in the row stubs of Tables 25.2 and 25.3.<sup>4</sup> All are expressed as annual outlays

Table 25.2. Productivity Estimates for Selected Classes of Resources on Farms With Returns Less Than \$5,000 to Capital and Management, East-Central Illinois (Grain Area), 1957

Class of resource	Percent increase in output from one-percent increase of resource input ( $b_i$ )	Error estimate for rate of percentage increase ( $Sb_i$ )	Increase in value of output from one-dollar increase of resource ( $MVP_i$ ) <sup>d</sup>
Building expense (annual)	0.0657 <sup>a</sup>	0.03887	0.93
Soil fertility inputs (annual)	0.0704	0.02688	1.82
Livestock and feed (annual) <sup>b</sup>	0.0701	0.01032	0.44
Operating expense (annual)	0.1884	0.06860	2.98
Machinery investment (inventory)	0.1608	0.04697	0.63 <sup>c</sup>
Machinery expense (annual)	0.2750	0.07142	2.53

<sup>a</sup>Not significantly different from 0 at five-percent level.

<sup>b</sup>Beginning livestock inventory plus purchase livestock and feed.

<sup>c</sup>Should not equal \$1 at optimum with unlimited capital available to acquire resources. Must be multiplied by reciprocal of annual rate of depreciation to transform to annual cost in order to make such a comparison.

<sup>d</sup>Evaluated at geometric means of the variables.

<sup>3</sup> For a more detailed discussion of fitting Cobb-Douglas functions with farm records data, see Gerhard Tintner and O. H. Brownlee, "Production functions derived from farm records," Jour. Farm Econ., Vol. 26, Aug., 1944, pp. 566-71.

<sup>4</sup> Two other variables were included in the analysis. They were land capital inventory and labor input. Output included sales, ending livestock inventory, and change in inventory of grain, feed, and seed.

Table 25.3. Productivity Estimates for Selected Classes of Resources on Farms With Returns Less Than \$5,000 to Capital and Management, West-Central Illinois (Livestock Area), 1957

Class of resource	Percent increase in output from one-percent increase of resource input ( $b_1$ )	Error estimate for rate of percentage increase ( $Sb_1$ )	Increase in value of output from one-dollar increase of resource ( $MVP_1$ ) <sup>d</sup>
Building expense (annual)	0.0159 <sup>a</sup>	0.02860	0.31
Soil fertility inputs (annual)	0.0147 <sup>a</sup>	0.01003	1.35
Livestock and feed (annual) <sup>b</sup>	0.4438	0.02576	0.94
Operating expense (annual)	0.0748	0.05959	1.58
Machinery investment (inventory)	0.0622	0.03390	0.36 <sup>c</sup>
Machinery expense (annual)	0.0693	0.05995	0.99

<sup>a</sup>Not significantly different from 0 at five-percent level.

<sup>b</sup>Beginning livestock inventory plus purchased livestock and feed.

<sup>c</sup>Should not equal \$1 at optimum with unlimited capital available to acquire resources. Must be multiplied by reciprocal of annual rate of depreciation to transform to annual cost in order to make such a comparison.

<sup>d</sup>Evaluated at geometric means of the variables.

except for machinery investment, which is expressed as a capital or inventory item. Thus its coefficient and derivatives therefrom cannot be interpreted in the same manner as can the coefficients for other resource categories. (See footnote c in the two tables.)

The regression coefficients are given in the first column. The statistical significance of each coefficient is judged by comparing its size with the size of its error estimate given in the second column. All coefficients differ significantly from zero except for building expense in both areas and for soil fertility inputs in the livestock area.

### Optimal Inputs

Estimates can be obtained from the regression coefficients for the income value of one-dollar increments in the various resource categories. These estimates are given in column 3. An exception to this interpretation already has been noted for machinery investment. In order to make its value productivity comparable, it is necessary that the number indicated be multiplied by the reciprocal of the annual rate of depreciation.

The average quantity of resources used on grain and livestock farms is given in columns 2 and 5 in Table 25.4. As would be expected, the greatest difference between the two groups of farms is found in livestock and feed and in soil fertility inputs. The lower outlays for soil fertility inputs in the livestock area reflect the complementary relation between the livestock and crop systems of farms in the area. With substantially less livestock, farms in the cash-grain area are shown to spend more on soil fertility.

Columns 1 and 4 of Table 25.4 show the resource quantities that would, according to the functions, be used to maximize profits. Comparisons of the differences between actual and optimum use in columns 3 and 6 are of interest. In the grain area the difference between optimal

Table 25.4. Actual and Optimal Use Rates for Resources,  
Cash-Grain and Livestock Farms, Illinois, 1957

Class of resource	Grain area			Livestock area		
	Optimum quantity <sup>a</sup>	Actual quantity <sup>b</sup>	Optimum minus actual	Optimum quantity <sup>a</sup>	Actual quantity <sup>b</sup>	Optimum minus actual
(dollars)						
Building expense	1,355	1,436	-81	455	1,473	-1,018
Soil fertility	1,525	801	724	430	318	112
Livestock and feed <sup>c</sup>	1,332	3,317	-1,985	12,329	13,719	-1,390
Operating expense	5,022	1,311	3,711	2,264	1,379	885
Machinery investment	3,042k <sup>d</sup>	5,326	-	1,692k	5,071	-
Machinery expense	8,093	2,251	5,842	1,970	2,048	-78

<sup>a</sup> Rate at which \$1 additional expense returns \$1, assuming other resources used at level of geometric means.

<sup>b</sup> Geometric mean of values for farm records used.

<sup>c</sup> Beginning livestock inventory plus purchased livestock and feed.

<sup>d</sup> The investment optimum must be adjusted to annual basis by a factor "k" which accounts for the depreciation rate.

and actual building expense is so slight that it could be due simply to chance.<sup>5</sup> In the case of livestock and feed (operating expense) and machinery expense, on the other hand, the difference is significant. For soil fertility inputs, one cannot be so certain.

Comparing optimum with actual use rates, the livestock farms appear to have been closer to an optimal organization than was true for the grain farms. For livestock and feed, the livestock farms also exhibit a relative "overuse" of resources. Size of observational error leads indicates the need to be cautious in ascribing much significance to the extent of overuse in the livestock area. Outlays on buildings likewise are relatively too high for profit maximization in both areas, though not greatly so in the grain area and perhaps not significantly so in the livestock area. The pattern of differences between optimum and actual rates of resource use suggests the possibility of some basic difference between these outlays and those for which the differences between optimum and actual are consistently positive. One hypothesis lies in the possibility that it is easier to finance outlays that entail the creation of assets (buildings, livestock, machinery) than it is to finance outlays that do not entail asset creation (fertilizers, operating expense, and machinery expense).

## LOAN LIMITS

Limits in use of loans may be imposed internally (by farmers) as well as externally (by lenders). Borrowing is a means to modify restraints on profit maximization. However, it also reduces the farmer's financial flexibility and increases the consequences of error in management or in expectation.

<sup>5</sup> Details in making this test are given in C. B. Baker, "Resource productivity in dryland farming," Proceedings, Western Farm Economics Association, 1952, pp. 36-40.



### Farmer Limits

Before 1940 Professor Kalecki developed the principle of increasing risk to show logically the plausibility of a restriction on firm size from exposure of equity as a result of using borrowed funds.<sup>6</sup> Consider two farmers equal in equity but different in indebtedness. For a given variation in asset prices, the percentage variation in equity is higher for the indebted farmer than for the debt-free farmer. Even though homogeneous in all other respects, including expectations on uncertain outcomes, it seems likely they still would differ in selection of a course of action. If it is assumed that the indebted farmer is not so deeply in debt as to make his asset ownership nominal, one would expect him to be more cautious if only to protect the equity he has that is relatively more exposed.

The cautious behavior might be reflected in several ways. One way might be through adopting alternatives that yield outcomes in short time periods. Another way might be to adopt alternatives with relatively small variance of probable outcomes. Another way might be to use decision criteria that include some notion of loss control in place of, or in addition to, profit maximization.<sup>7</sup> In any case, the result is a resource organization different from that yielded by perfect knowledge and a profit-maximizing motivation.

### Lender Limits

The use and allocation of resources may be affected by lender decisions as well as these "internal" factors. A borrower may abandon a project on recommendation of a lender that he do so. Or a lender may refuse to finance assets required for project A but agree to finance assets for project B. It is apparent that any loan adds generally to the sum of assets available to the farmer. Thus, to expand project B with borrowed funds may make possible an expansion also of project A with the use of resources not required to be financed. The fact that this possibility exists has led to the fallacious conclusion that credit available to farmers is completely fluid or nonspecialized. What difference does it make that a farmer finances feeder cattle more easily than fertilizer purchases if he simply uses his borrowing power to finance cattle and his other resources to buy fertilizer? It makes no difference as long as the attainment of a profit maximum is unaffected by the total capital plus borrowing power available to the farmer. However, if profit maximizing is restricted by ability to borrow, it does make a difference. Financing assets that create new borrowing power lifts substantially the restriction on profit maximizing. Financing assets that do not have this

<sup>6</sup>Michael Kalecki, "The principle of increasing risk," *Essays in the Theory of Income Fluctuations*, Irwin, Ltd., London, 1939, pp. 95-106.

<sup>7</sup>C. B. Baker, *Decision-Making and Financing Farm Assets*, J. S. McLean Memorial Lecture, Ontario Agricultural College, Guelph, Ontario, Feb. 11, 1960.

effect "absorbs" the farmer's equity at a rapid rate. Financing feeder cattle for a farmer in good financial condition with an adequate feed supply may absorb but little of the farmer's equity. On the other hand, financing a fertilizer purchase which creates no increase in pledgeable assets might result in a heavy absorption of the equity the farmer had prior to the loan.

Whether or not these results materialize depends on lender response to loan applications to finance these various activities. A survey of lenders was conducted to test the above ideas. The reason for studying two areas lies in the hypothesis that there may be a difference in lender response related to the type of farming dominant in the area. Thus, a farmer in the cash-grain area might experience a lower limit to finance livestock than he might if he were in a livestock area.

### Estimating Lending Limits

From available records a farm was synthesized for each area described in terms of assets and liabilities (Table 25.5). The farms were so constructed that they were identical in the three equity measures indicated at the bottom of the table. However, they differed in detail. Three additional criteria guided the synthesis. The various categories

Table 25.5. Financial Summaries for Farms Used To Base  
Loan Requests in Selected Farming Areas of Illinois

Item	Area	
	East-central (cash-grain)	West-central (livestock)
	(dollars)	
Cash	1,431	250
Cash value of life insurance	910	279
Farm feeds	1,571	1,935
Market livestock	6,784	8,688
Current assets	10,696	11,152
Other livestock	398	1,040
Machinery and equipment	8,492	7,394
Working assets	8,890	8,434
Real estate	38,125	38,125
Total assets	57,711	57,711
Open account (grain elevator)	620	1,152
Note on cattle	5,500	5,500
Fertilizer loan	282	206
Current liabilities	6,402	6,858
Machinery purchase contract	3,125	2,669
Real estate mortgage	19,684	19,684
Total liabilities	29,211	29,211
Net worth	28,500	28,500
Current worth	4,294	4,294
Intermediate worth	10,059	10,059

of assets needed to be roughly consistent with the means of resource categories for which the productivity estimates were made (Table 25.4). The farms needed to be so synthesized that they would appear familiar to lending officers in each of the two areas. Finally, the farm descriptions needed to be consistent with a plausibly constructed lending situation described by the interviewer. Indeed, the lending situation involved the personal characteristics of the interviewer himself!

Lending officers were interviewed in 21 lending institutions in each area, distributed by type of lender as shown in Table 25.6. Locations of the institutions are shown within the areas outlined in Figure 25.1. Interviews were started in September and completed in October. Timing the interviews was a critical problem. Much of the methodological value of the observational technique rested on preserving the context of an actual lending situation. Yet, at any given time of the year, loan applications would be more appropriate for some purposes than for others. Financing feeder cattle reaches a peak of activity in the fall of the year, which was the observational period. Machinery financing might be expected to be at a seasonal low. To take into account the effects of seasonal variations on lender response would have required considerably more time and resources than were available for this research undertaking.

In obtaining loan estimates, the interviewer identified himself to the farm lending officer, enlisted his cooperation in the project, and suggested the following lending situation: A potential customer purchased 80 acres with assurance of being able to rent an additional adjoining 160 acres from the same landowner on a crop-share lease. Location was approximately specified in the lender's community to control the mental picture of land type in all interviews. It was suggested that this man's father had rented the 160 acres for many years before retiring, but did business in another community. Hence, the interviewee would not be personally acquainted with the family. The young man was 31 years old, married, had two children, and was reared on a rented farm. The young man and his wife had worked in a factory for four years to acquire capital, and had begun farming on 160 acres in a neighboring county without any parental financial aid. Livestock experience had included feeding 25 head of steers the past two years and raising ten litters of hogs each of the last four years. Income had been supplemented with off-farm labor as much as possible. This background and the financial statement

Table 25.6. Schedules Taken From Lenders in Two Illinois Farming Areas, by Type of Lender, 1959

	Small banks <sup>a</sup>	Large banks <sup>b</sup>	PCA	Total
Grain area	9	8	4	21
Livestock area	9	8	4	21

<sup>a</sup>Banks in towns where there is no other bank or PCA office.

<sup>b</sup>Banks in towns which have a competing lending agency (bank or PCA) in the same town.



suggested that the young man was a capable and industrious operator, making good financial progress.

Upon presentation of this situation, the lender was asked to assume that the farmer described desired to become a customer. It was suggested that the farmer felt the present financial structure would permit a minimum operation without borrowing, but that faster financial progress could be made with the use of borrowed funds. Hence, it was proposed that five alternative loan requests be considered in turn (randomly ordered between interviews) assuming the remaining needs could be met with available funds. Maximum available loans and the terms for the first loan purpose were determined and recorded. Then the interview reverted to the pre-loan situation and a second loan purpose was considered. The process was repeated for each request.

The proposed use of funds for each purpose was plausibly "spelled out." For example, the machinery purchase request was for the larger equipment needed in going from 160- to 240-acre operations and for replacement of old machines (as specified in the detailed machinery inventory worked out prior to the interview). Thus, the loan amounts obtainable tend to group at levels representing combinations of specific requests. Similar justification was made for other requests. In each case the initial loan request was for an amount greater than believed obtainable. This was done as a "shock" treatment in the hope of obtaining less "interviewer-conditioned" responses than might be obtained by successively increasing requests until a cutoff was obtained. It was hoped that this approach might suggest naïveté of the interviewer and thus allow the lender to use his correct judgment in "teaching" a realistic evaluation. It was feared the increasing-amounts request method might produce overly large "interviewer-pleasing" responses.

### Loan Limits Obtained

Loan limits established by interview procedures already outlined were tabulated for each type of lending institution in each area. The arithmetic means are presented in Table 25.7. The original intention was also to observe any differences between types of loan in terms of loan, i.e., interest rate, use of chattel mortgage, length of loan, and the like. The purpose was to determine whether changes in such terms with respect to loan amount might differ by type of loan. However, this attempt was unsuccessful. The response generally implied that for a given borrower and purpose the central question was approval of the loan, and that the terms of loan were subsidiary considerations which were set by general policy of the institution in question. That is, for purpose A a loan was possible to a limit of \$X, and within this limit the terms of loan were not observed to vary in any way.

Variation in interest rate and terms between borrowers with different amounts of assets was an observed fact, however, as was variation in interest rate by bankers in the livestock area to favor feeder-cattle

Table 25.7. Mean Maximum Borrowing Limits, by Type of Lender  
and Proposed Use of Loan Proceeds,  
Two Areas of Illinois, 1959<sup>a</sup>

Area and agency	General operating expense	Machinery purchase	Feeder- cattle purchase	Buildings and buildings repair	Fertilizer purchase	All purposes
(mean dollar loan amounts)						
Livestock area						
Small banks	1,478	1,167	6,128	322	624	1,944 <sup>b</sup>
Large banks	2,212	1,725	7,581	1,100	875	2,699 <sup>b</sup>
PCA	2,500	3,700	6,000	1,550	972	2,944 <sup>b</sup>
All agencies	1,952	1,861	6,657	852	786	2,422 <sup>c</sup>
Grain area						
Small banks	2,167	844	5,944	867	934	2,151 <sup>b</sup>
Large banks	1,837	487	4,975	1,075	1,591	1,993 <sup>b</sup>
PCA	1,775	1,500	7,000	1,850	1,375	2,700 <sup>b</sup>
All agencies	1,966	833	5,776	1,133	1,268	2,195 <sup>c</sup>

<sup>a</sup> Except as stated in the following footnotes, differences between areas and lending agencies for given loan types have not been tested for statistical significance.

<sup>b</sup> The loan limit for all purposes, averaged for all Production Credit Associations, exceeds the average for all banks with a difference significant at a five-percent probability level.

<sup>c</sup> The loan limit for all purposes, averaged for all agencies, does not differ between areas at an acceptable probability level.

loans. These facts apparently reflected policies set by farmer-controlled boards of directors. No such variation in chattel commitments was noted among purposes, and the security required varied from only a signature to notes on all available chattels.

If the aggregate response of all institutions is considered, no difference in loan limit to finance general operating expense was observed between the two areas. Otherwise, there appeared to be a tendency for the limit to be higher in the livestock area for feeder-cattle purchase (expected) and for purchase of machinery (somewhat unexpected). Finally, the limits tended to be higher in the grain area for fertilizer purchase (expected), but also higher for buildings and building repair (somewhat unexpected).

In the livestock area, the Production Credit Associations fixed loan limits somewhat higher than did either small or large banks for all loan types except for purchase of feeder cattle. In the grain area, the Production Credit Associations fixed higher loan limits than did banks on feeder cattle and buildings and machinery purchases, but their limits on general operating expense were lower. PCA loan limits on fertilizer purchases were higher than those of small banks and lower than those of large banks.

Small banks were more conservative than large banks for all types of loans in the livestock area. In the grain area they were more conservative in financing outlays for building and fertilizer but less conservative for feeder cattle, machinery purchase, or general operating expense. Thus, it is difficult to conclude with certainty that competition among lending institutions, as found in the large bank category, generally has the effect of reducing conservatism in appraising loan

applications.<sup>8</sup> Any such effect may be offset by the fact that those banks without a competitor in the same town were in the smaller farming communities and tended to be more familiar with farming.

### Classification and Analysis

When loan proceeds are used to finance general operating expenses, no specific assets are created in the process. The same is true, though with some modification, in the case of fertilizer purchases. In the case of machinery or feeder cattle, assets are created that are specific and tangible. Though less so, the same tends to be true of building outlays. Therefore, loans are grouped without regard to type of lender in categories distinguished as indicated in parts A through D of Table 25.8. Differences between areas for given loan classes are shown in the third column. The average maxima for given loan classes are shown in the last column. The fact that the difference between areas was not significant at acceptable probability levels suggests that it is entirely appropriate to so aggregate responses over both areas.

Table 25.8. Mean Maximum Loan Limits, by Class of Loan, Two Areas of Illinois, 1959<sup>1</sup>

Class of loan	Mean loan limit		Difference between areas	Mean loan limit for both areas
	Livestock area	Grain area		
	(dollars)			
A. Asset creating <sup>a</sup>	3,124	2,581	543	2,852
Not asset creating <sup>b</sup>	1,369	1,618	-249	1,493 <sub>h</sub>
Difference	1,755	963		1,359 <sup>h</sup>
Difference between differences		792 <sup>f</sup>		
B. Feeder cattle <sup>c</sup>	6,657	5,776	881	6,217
Machinery or buildings <sup>d</sup>	1,356	963	393	1,160 <sub>h</sub>
Difference	5,301	4,813		5,057 <sup>h</sup>
Difference between differences		488 <sup>e</sup>		
C. Machinery	1,861	833	1,028	1,348
Buildings	852	1,133	-281	993 <sub>h</sub>
Difference	1,009	-300		355 <sup>h</sup>
Difference between differences		1,309 <sup>e</sup>		
D. General operating expense	1,952	1,966	-14	
Fertilizer purchase	786	1,288	-502	
Difference	1,166	678		
Difference between differences		488 <sup>g</sup>		

<sup>a</sup> Machinery, feeder cattle, or buildings.

<sup>b</sup> General operating expense or fertilizer purchase.

<sup>c</sup> Illustrative of asset creation at a rate high with respect to loan level.

<sup>d</sup> Illustrative of asset creation at a rate low with respect to loan level.

<sup>e</sup> Not significant at acceptable probability level.

<sup>f</sup> Significant at 10 percent probability level.

<sup>g</sup> Significant at 5 percent probability level.

<sup>h</sup> Significant at 2.5 percent probability level.

<sup>i</sup> A split-split plot analysis of variance model was used, with areas, type of lending agency, and purpose as factors.

<sup>8</sup> All statements in these last three paragraphs must be tempered by reference to footnotes in Table 25.7 wherein probability levels are reported for differences found to be significant. Tests to establish the significance of difference take account of variations in response as well as the mean levels of responses reported in the body of the table.



All three loan types that create assets are aggregated in part A. Analysis of variance yields a conclusion that loans in this class are granted to a limit significantly higher than is the limit for loans of the nonasset-creating class, and that this distinction was stronger in livestock than in the grain area. In part B, the asset-creating class was disaggregated in order to compare the component which was thought to create added loan value at a relatively more rapid rate (feeder cattle) with the rest of the aggregate. Again, the difference is highly significant. The remaining two components of the asset-creating class of loans are compared in part C. The difference here, too, is significant. The difference might be ascribed to institutional policies that restrict lending on real property. But there may also be an economic reason related to the relatively slower rate of turnover of building capital, as compared with machinery capital. Thus, the asset-creating class in decreasing order is feeder cattle, machinery, and buildings. The apparent reverse order of machinery and buildings in the grain area is not statistically significant. In the grain area, PCA loans for each purpose were larger than bank loans by about the same percentage. But in the livestock area, the difference between PCA and bank limits was much larger for machinery than for buildings. It has been suggested that this difference is due to variations in relative willingness to make machinery loans of longer than one-year terms.

In part D, the two components of loans that do not create assets are compared. It may be difficult to find a reasonable hypothesis for the observed difference. Actually, the difference is slight in the grain area where heavy rates of fertilizer applications are much more common than in the livestock area. One might suspect from comments made in interviews that lenders may ascribe to the need for financing general operating expense some meaning as regards the ability of the applicant to manage his financial organization. Yet they recognized also that meeting the general operating expenses was a condition necessary to successful pursuit of any plan of operation. Many respondents in the livestock area commented that fertilizer lending was a practice of recent origin and that they were being conservative because they lacked the knowledge of responses needed to appraise the request.

## IMPLICATIONS

Having established that differences in loan limits exist among types of loans, there remains the question of whether the differences are in accord with resource quantities optimal in the two farm organizations. Estimates given in Table 25.9 and 25.10 are derived from preceding tables as indicated by the footnotes. In the first column are the resource quantities in each category listed for the synthesized farms. In the second column are loan limits established at averages of lender response. By adding these two estimates, we get an estimate of the maximum quantity the applicant could command by using his whole borrowing power, alternatively, for each of the five purposes.

Table 25.9. Comparison of Optimal Resource Quantities and Quantities Owned and Capable of Being Financed, Livestock Area, 1959

Class of resource	Quantity on hand <sup>a</sup>	Mean loan limit <sup>b</sup>	Maximum quantity <sup>c</sup>	Optimum quantity <sup>d</sup>	Optimum less maximum <sup>e</sup>
(dollars)					
Livestock and feed	10,623	6,657	17,280	9,233	-8,047
Machinery	7,394	1,861	8,255	3,915	-4,340
Buildings	19	852	871	455	-416
Fertilizer	18	786	782	430	-352
Operating expense	213	1,952	2,165	2,264	99

<sup>a</sup>From column 2, Table 25.5: livestock and feed excludes other livestock; buildings include (all) real estate; cash on hand is allocated among buildings, fertilizer, and operating expense in the proportion shown optimal.

<sup>b</sup>From Table 25.7, row 4.

<sup>c</sup>The sum, column 1 plus column 2.

<sup>d</sup>From Table 25.3 for buildings, fertilizer, operating expense; for livestock and feed and for machinery: column 1 less deviation from optimum given in Table 25.4.

<sup>e</sup>The difference, column 4 less column 3.

In column 4 are listed the resource quantities optimal according to productivity estimates established from the farm records described previously. These estimates reflect optima for the average levels of inputs on the farms, while the maximum quantities in columns 1 and 3 are for the synthesized farm used in the lending situation. These may be reconciled by recalling that the synthesized farm was based on the average farm of the productivity estimates. Structural similarities are evidenced by the comparisons of factors made in Table 25.11. Hence the comparison of the two sets of estimates provides an approximation of the possible effects of loan limits on the attainment of optimum farm

Table 25.10. Comparison of Optimal Resource Quantities and Quantities Owned and Capable of Being Financed, Cash-Grain Area, 1959

Class of resource	Quantity on hand <sup>a</sup>	Mean loan limit <sup>b</sup>	Maximum quantity <sup>c</sup>	Optimum quantity <sup>d</sup>	Optimum less maximum <sup>e</sup>
(dollars)					
Livestock and feed	8,355	5,776	14,131	6,370	-7,761
Machinery	8,492	833	9,325	6,280	-3,045
Buildings	243	1,133	1,376	1,355	-21
Fertilizer	272	1,268	1,540	1,525	-15
Operating expense	916	1,966	2,882	5,022	2,140

<sup>a</sup>From column 2, Table 25.5: livestock and feed excludes other livestock; buildings include (all) real estate; cash on hand is allocated among buildings, fertilizer, and operating expense in the proportion shown optimal.

<sup>b</sup>From Table 25.7, last row.

<sup>c</sup>The sum, column 1 plus column 2.

<sup>d</sup>From Table 25.2 for buildings, fertilizer, operating expense; for livestock and feed and for machinery: column 1 less deviation from optimum given in Table 25.4.

<sup>e</sup>The difference, column 4 less column 3.

Table 25.11. Comparison of Structural Features of the Farms Used in Productivity Estimates and in the Lending Situation

Feature	Grain area		Livestock area	
	Productivity	Lending	Productivity	Lending
Total acres	257.7	240	227.4	240
Soil productivity rating	81.5	- -	76.4	- -
	(dollars)			
Beginning livestock inventory	4,535	5,282	9,067	9,945
Livestock purchase	1,924	3,148	5,280	3,218
Labor input	3,327	3,200	3,558	2,796
Annual machinery expense <sup>a</sup>	4,374	4,529	4,085	4,149
Returns to capital and management	2,192	2,504	2,457	2,246

<sup>a</sup>Includes depreciation, machinery repairs, machine hire, fuel, and farm share of automobile expense.

organization. Exact comparisons will be made when the estimates for the synthesized farm are completed.

In the last column of Tables 25.9 and 25.10, the maxima available to the applicant have been subtracted from the optimum resource quantities. These figures must be interpreted carefully. They do not represent an attainable distortion of farm organization when taken together. Each figure must be considered by itself. Each estimate of optimum assumes other resources are fixed at existing levels. Each estimate of maximum assumes the financing of no other assets. A negative number means more of the resource is available than would be optimal. A positive figure means less of the resource is available than would be optimal.

It is apparent that it would be rather easy for the operator in either area to obtain a relative oversupply of livestock, feed, or machinery. In fact, his controlled assets in these categories are already excessive. He would not seem particularly limited in access to financing for buildings and fertilizer in the livestock area. In the grain area he nears his limit with respect to these resources. In both areas, the farm operator finds it difficult to finance the general operating expenses at levels found optimum in the areas. This may reflect a belief on the part of lenders that operators should finance operating expenses out of their own cash and current income.

If this is so, it may be, as has long been suggested, that seasonal demands for cash comprise a determinant of farm organization. How strong it is would depend on the extent to which the farmer relies on his credit to finance his operation. Our cases have been synthesized to insure that loan limits would be reached at levels that might affect the organizations. Many farmers are not so vulnerable to loan decisions. On the other hand, many farmers are just as fully exposed—some even more so.

The estimates given in Tables 25.9 and 25.10 do no more than



suggest the possibility that there may be a connection between loan limits that differ by use of loan proceeds and the resource organization of farms. This project is in its final phase. A model will be developed to indicate the conditions in which the above situation might logically be expected to occur. It may well be that the difficulty in financing operating expenses affects the farmer's distribution of cash and credit among the other resource categories. This problem will be studied in the above research project.

## *Discussion*

### EDWARD M. NORMAN\*

From an approach utilizing economic theory, we have an opportunity to look at a practical study in the Baker-Irwin presentation. A comparison is made between a cash-grain area and a livestock area, each apparently having the same productive resources and capabilities. Probably the study of farms of \$5,000 or less per year would give a better insight into the basic problems.

Much use is made of the optimum input based on past production records of an area. An optimum level based on past records is excellent, but it must be realized that the relationship between input and output does not assume definite arithmetical or geometrical proportions. These levels are well used as a basis for comparison and do not necessarily indicate that a particular investment loses money.

The approach was made to lenders utilizing identical financial statements modified only to present minor differences in the assets of a farmer typical of each area. The attitudes of lenders of each area may be summarized as follows: (1) lenders in the grain area were more liberal toward soil fertility; (2) similarly, lenders in the livestock area were more liberal on feeder cattle; (3) all lenders looked with more favor on asset-creating loans; and (4) loan levels, with few exceptions, increase from small banks to larger banks to PCA's. This brief summary of the findings is similar to our own personal observations gained through experience in agricultural credit.

It seems that both farmers and lenders alike in a given area tend to follow similar patterns in enterprises and apply capital accordingly. Each of us would have predicted that lenders in the cash-grain area would have favored soil fertility more than lenders in the livestock area, and similarly, that lenders in the livestock area would favor livestock enterprises more than farmers in the cash-grain area. Since other resources are vitally important in both areas, attitudes are

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almost the same. By this proposition we feel that farmers do not farm for maximum profit but are inclined to meet certain goals in income, and do not abandon practices until forced to do so. They are motivated by competition and the standards of the community in the application of capital.

J. H. YEAGER  
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## *Use of Credit for Purchases of Fertilizer<sup>1</sup>*

FARMERS HAVE MADE MANY CHANGES in the kinds and quantities of resources used in production. In 1930 U. S. farmers produced 70 to 80 percent of the production inputs used on farms. By 1960 they bought more than 50 percent. Aside from the family labor input, almost all inputs embodied in agricultural products are purchased.

The advance in production technology has meant increased cash costs and higher farm investments (cf. Chapters 6 and 7). When measured in constant dollars, expenses per farm for fertilizer and lime, feed, petroleum fuel, and oil more than tripled from 1935 to 1960. Depreciation charges and purchases of livestock, seed, and miscellaneous supplies and services doubled. If the costs of all such items at constant prices are added together, they average about 2 1/2 times as much per farm in 1955 compared with 1935-39.<sup>2</sup>

In Alabama prior to 1956 the amount spent for fertilizer and lime was the major single cash expenditure by farmers. Since 1956 expenditures for feed account for a greater percentage of total cash expenses than fertilizer and lime. In 1957, 30.4 percent of all cash expenses for production was for feed and 21.8 percent for fertilizer and lime.

In view of the importance of fertilizer in the agricultural economy of Alabama, a cooperative study with TVA was initiated in 1957. The purpose of the study was to obtain information from a sample of farmers, fertilizer dealers, and credit agency representatives in order to determine the levels of fertilizer use on selected crops, factors associated with high levels of fertilizer use, acceptance of high analysis fertilizer, and to gain a better understanding of the role of credit and the influence of credit agencies on the demand and use of fertilizers.

Personal interviews with a representative sample of 463 farmers in 16 Alabama counties provided basic data for the farmer phase of the study. In order to qualify as a farmer, the operator must have had \$200 or more of farm income in 1957. Data for the dealer and credit agency phase of the study were secured from a sample of 41 fertilizer dealers

<sup>1</sup> Appreciation is expressed to Mr. O. D. Belcher, formerly with the Department of Agricultural Economics, for machine tabulation of most of the data presented in this report.

<sup>2</sup> R. P. Christensen and R. J. Muck, "More capital goods used in farm production," Farm Cost Situation, ARS, USDA, Washington, D. C., May, 1957, p. 27.



or merchants and 41 credit agency officials, the majority of which represented commercial banks.

### USE OF CREDIT BY FARMERS

Fifty-eight percent, or 268 out of the 463 farmers, borrowed funds to buy fertilizer in the spring of 1957. Borrowing was most prevalent in areas of the state where farms were largest in size and agriculture was most commercial. Purchases on 30-day accounts were not considered as borrowing. Only three farmers reported the use of credit for fall purchases of fertilizer.

Based on estimates of the cost of fertilizer purchased, the amount borrowed, and the percentage of farmers using credit, it is estimated that 46 percent of the dollar cost of purchases was on a credit basis. Of the farmers who borrowed, three-fourths obtained loans equal to or greater than the cost of fertilizer purchased. Loans were not strictly for fertilizer purchases. They included funds for seed, insecticides, and other production items. However, fertilizer was the major item.

### Sources of Credit

Commercial banks were the source of credit for 38 percent of the farmers. Fertilizer dealers and landlords were the next two most important sources. Production Credit Associations, the Farmers Home Administration, and individuals other than landlords were the next most important sources, as shown in Table 26.1.

Table 26.1. Sources of Credit Used for Fertilizer Purchases,  
268 Farmers, Alabama, 1957

Source of Credit	Percent of farmers reporting various sources of credit
Commercial bank	38
Fertilizer dealer	26
Landlord	20
Production Credit Association	8
Farmers Home Administration	4
Individual other than landlord	3
Other	1
Total	100

Many reasons were given by farmers for using the given sources of credit. The most frequently given reason was that the particular source of credit was used due to past use, tradition, or habit. Other reasons given in order of importance were "felt obligated to landlord," "low interest rates," "convenient," "only source available," and "fair and just treatment." More than half (59 percent) of the farmers who borrowed

money said they knew of no other source of credit they would consider using. Besides the sources of credit used, known sources that farmers would consider using were most frequently reported as commercial banks and fertilizer dealers. The amount of money borrowed was less than \$1,000 for 68 percent of the 268 farmers who borrowed for fertilizer purchases. Only 9 percent borrowed more than \$2,000.

### Annual Rate of Interest Paid

The annual rate of interest paid varied with source of funds and prevailing rates in local areas. Farmers who borrowed from landlords paid the highest average annual rate of interest (Table 26.2). Financing

Table 26.2. Range and Average Annual Rate of Interest Paid on Fertilizer Loans According to Source of Credit, 206 Farms, Alabama, 1957

Source of credit	Farms (number)	Annual interest rate paid	
		Range	Average
		(percent)	
Landlord	28	0 - 48	11.1
Commercial bank	90	6 - 19	7.3
Fertilizer dealer	48	0 - 18	6.3 <sup>a</sup>
Production Credit Association	20	3 - 6 <sup>b</sup>	6.0
Individual other than landlord	7	0 - 14	5.6
Farmers Home Administration	10	4 - 6	4.9
Other	3	—	7.0

<sup>a</sup> In calculating rate of interest paid, the principal amount borrowed was based on the credit price for fertilizer, which was somewhat higher than the cash price.

<sup>b</sup> The 3 percent includes the dividends received on stock.

of tenants was most common in the south-central portion of Alabama, known as the Black Belt. Rates of interest paid to other sources of credit in this area were also higher than rates paid in other parts of the state.

Fourteen farmers out of 206 for whom interest rates paid are reported obtained a discounted loan— one in which interest was deducted in advance. As a result, interest rates paid were higher than those stated. This is reflected in the data given in Table 26.2. Many farmers did not know the annual rate of interest they paid. Evidently they did not evaluate the cost of credit from various sources.

From 1935 to 1960 the percentage of farmers in Alabama operating as tenants declined from almost 65 percent to 35 percent. Operating as a tenant is frequently given as a solution or means of best utilizing limited dollar credit, since a higher rate of return is normally made on operating capital than on real estate.

## Security for Fertilizer Loans

Security reported for loans included unsecured notes, crop notes, chattel mortgages, and real estate mortgages. Twenty-five percent of the 268 farmers who borrowed money for fertilizer purchases indicated that no security was required. Forty-five percent reported a chattel mortgage; 21 percent, a crop note; 5 percent, a real estate mortgage; and 4 percent, an unsecured note.

Chattel mortgages might be satisfactory security if the lender would handle all of the borrower's operating credit needs. It is doubtful that real estate mortgages should be used as security for operating loans, although the lender may feel this necessary for the risk incurred. In a study conducted in 1955 in three Tennessee Valley counties in Alabama, it was found that only 49 percent of the farmers had fire insurance on buildings and only 38 percent had life insurance.<sup>3</sup>

Repayment of loans in a majority of cases was from receipts from the sale of crops. Receipts from the sale of livestock and Soil Bank (Acreage Reserve) payments were also used for the repayment of loans. Only 5 percent reported income from off-farm work as a source of funds to repay fertilizer loans.

## COMPARISONS BETWEEN CREDIT AND NONCREDIT GROUPS

The credit group consisted of a higher percentage of tenants than the noncredit group (Table 26.3). Only 52 percent of those who borrowed had completed seven or more grades of formal education compared to 72 percent for the noncredit group. Average farm net worth of the noncredit group averaged about twice as great as the net worth for the credit group. The noncredit group also applied fertilizer to a higher percentage of their open land and fertilized cotton and corn at heavier rates than did the credit group of farmers. There was less difference in average amount of plant nutrients applied to hay and pasture crops than to cotton and corn between the two groups of farmers. Sixty-one percent of the noncredit group of farmers checked fertilizer prices with more than one fertilizer dealer prior to making purchases. Only 45 percent of the farmers who used credit checked fertilizer prices at more than one place. Since almost one-half of this group were tenants, many did not have the opportunity to check fertilizer prices if the landlord financed their share of the fertilizer cost.

## BASIS FOR FERTILIZER PURCHASES

Apparently tradition and habit play major roles in decisions on the kind and amount of fertilizer bought, just as is true in the use of credit.

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<sup>3</sup>O. D. Belcher and J. H. Yeager, "Insurance coverage of Alabama farmers," Highlights of Agricultural Research, Agr. Exp. Sta., Auburn Univ., Vol. 7, No. 1, Spring, 1960.



Table 26.3. Selected Characteristics of Farmers Who Used Credit and Those Who Did Not Use Credit for Fertilizer Purchases, Alabama, 1957

Item	Noncredit group		Credit group		All farmers	
	Number reporting	Average	Number reporting	Average	Number reporting	Average
Number of farms	195		268		463	
Age of farm operator <sup>a</sup>	195	53	268	49	463	51
Percentage tenants	-	13	-	43	-	31
Percentage that completed 7 or more grades of school	-	72	-	52	-	61
Estimated farm net worth	186	\$22,085	252	\$11,560	438	\$16,030
Months of off-farm work by operator <sup>b</sup>	66	8	80	5	146	6
Acres of open land <sup>c</sup>	193	86	268	120	461	105
Acres of open land fertilized in 1957 <sup>d</sup>	187	55	268	63	455	60
Percentage of open land fertilized	-	64	-	53	-	57
Percentage who had ever had soil tested	-	33	-	27	-	30
Percentage that check fertilizer prices at more than one place before buying	-	61	-	45	-	51
Pounds of plant nutrients used on cotton:						
N	110	52	214	48	324	49
P <sub>2</sub> O <sub>5</sub>	110	59	215	52	325	54
K <sub>2</sub> O	110	56	215	47	325	50
Total <sup>e</sup>		167		147		153
Yield of cotton (pounds of lint/acre) <sup>f</sup>	109	419	215	353	324	375
Pounds of plant nutrients used on corn:						
N	167	44	253	38	420	40
P <sub>2</sub> O <sub>5</sub>	166	31	243	26	409	28
K <sub>2</sub> O	165	25	241	21	406	23
Total <sup>g</sup>		100		85		91
Yield of corn (bushels/acre) <sup>h</sup>	165	33	252	25	417	28
Pounds of plant nutrients used on hay and pasture crops:						
N	67	19	59	14	126	17
P <sub>2</sub> O <sub>5</sub>	89	27	80	21	169	24
K <sub>2</sub> O	86	26	77	22	163	24
Total <sup>i</sup>		72		57		65

<sup>a</sup>Calculated "t" for difference in means of noncredit and credit group is 3.45\*\*<sup>b</sup>Calculated "t" for difference in means of noncredit and credit group is 4.35\*\*<sup>c</sup>Calculated "t" for difference in means of noncredit and credit group is 11.93\*\*<sup>d</sup>Calculated "t" for difference in means of noncredit and credit group is 0.81<sup>e</sup>Calculated "t" for difference in means of noncredit and credit group is 3.03\*\*<sup>f</sup>Calculated "t" for difference in means of noncredit and credit group is 3.93\*\*<sup>g</sup>Calculated "t" for difference in means of noncredit and credit group is 2.33\*<sup>h</sup>Calculated "t" for difference in means of noncredit and credit group is 6.11\*\*<sup>i</sup>Calculated "t" for difference in means of noncredit and credit group is 1.26

\*Significant at 5 percent probability level.

\*\*Significant at 1 percent probability level.

Fifty-three percent of the farmers surveyed replied that they made the decision on fertilizer grade on the basis of past grades used. Twelve percent mentioned general recommendations, and 7 percent replied that they used soil-test recommendations. Other factors mentioned which led to a decision on grades of fertilizer to use were: "grade neighbor uses," "grade dealer recommends," "grade landlord recommends," and "cheapest grade per ton." Questions about how they decided the amount of fertilizer to use were similar to those for grade decisions.

Only half of the farmers considered cost of the fertilizer in deciding on the grade and amount to buy. Of those considering cost, cost per ton was the major basis for decisions. Twenty-seven percent considered cost per pound of plant nutrients, and 4 percent considered expected returns from using more fertilizer against the cost of this additional fertilizer. Apparently very few, if any, farmers calculated the cost per pound of plant nutrients for alternative sources of single elements or mixed grades of fertilizer. Better use of credit for fertilizer purchases would be achieved by recognizing differences in cost of plant nutrients by sources and by using the cheapest source in most cases. It is doubtful, however, that very many farmers could make such calculations without assistance. Thirty-nine percent of the farmers in the group had completed less than seven grades of formal education.

Thirty-six percent of the farmers in the sample said they preferred nitrate of soda, while 40 percent preferred ammonium nitrate. From July 1, 1957, through June 30, 1958, Alabama farmers purchased 66,129 tons of nitrate of soda and 47,411 tons of ammonium nitrate. With an average price of \$58 per ton for nitrate of soda and \$78 per ton for ammonium nitrate, the total cost was \$7,533,540. At the stated prices per ton, N from nitrate of soda cost 18.1 cents per pound, while N from ammonium nitrate cost 11.6 cents per pound. If the total nitrogen purchased in these two materials had all been bought in ammonium nitrate, the difference in cost or savings would have been \$1,371,930. The potentials in cost reductions and in better use of limited capital, either from a farmer's own funds or from credit sources, have not been realized from the use of higher-analysis fertilizers and cheaper sources of plant nutrients.

#### FERTILIZER DEALERS AND CREDIT AGENCIES

In the dealer and credit agency phase of the study, data were obtained from a sample of 41 fertilizer dealers, 33 commercial banks, 4 Production Credit Associations, and 4 Farmers Home Administration offices.

Dealer sales ranged from 42 to 4,515 tons of fertilizer in 1957, the average being 1,118 tons. Sixty-four percent of the dealers sold less than 1,000 tons. Dealers with a large volume of sales usually handled from 11 to 15 grades or kinds of fertilizer. Most fertilizer dealers also handled other products, although fertilizer sales accounted for 62 percent



of their total sales. The average number of customers who purchased fertilizer was 183 per dealer.

Sixty-two percent of the dealers sold fertilizer on a credit basis, including 30-day account sales. Not considering 30-day account sales, only 30 percent sold on a credit basis. About one out of three farmers purchased fertilizer on credit, according to dealers' reports. On the basis of dollar sales, credit sales represented 30 percent of the total in 1957. Although there was little difference in the average number of tons of fertilizer sold per firm between those that extended credit and those that did not, the average amount sold per customer was 8.8 tons for the credit group compared with 4.5 tons for the noncredit group.

### Credit Terms and Practices

The average annual stated rate of interest charged and average number of months that production loans were outstanding for credit agencies providing funds to farmers were as follows:

<u>Source of credit</u>	<u>Annual stated interest rate</u>	<u>Months</u>
Fertilizer dealers	7.4	6.4
Commercial banks	6.7	8.2
PCA	5.0	10.2
FHA	6.0	10.0

Average annual stated rates of interest varied somewhat with size of fertilizer dealers. Those with a large volume of business (sales of 1,000 tons or more) had an average rate of 6.7 percent. Those with medium (sales of 500 to 999 tons) and small (sales of less than 500 tons) volumes of sales had average rates of 7.0 and 7.9 percent, respectively.

Regardless of time the loan was outstanding, interest was charged at a flat rate by 72 percent of the fertilizer dealers and 58 percent of the banks. Based on the average annual stated rate of interest and the average number of months loans were outstanding, dealers who disregarded the length of time that loans were outstanding in calculating interest charges had an effective rate of 13.8 percent, and bankers 9.8 percent. Furthermore, four commercial banks reported making discounted loans or the practice of taking interest out in advance. Some firms — banks, in particular — varied the method of calculating interest according to size of the loan. The length of time that the loan was outstanding was considered in determining the amount of interest due on a large loan but not on a small one. All lenders permitted borrowers to repay their loans prior to the date due. However, 24 percent of the bankers and 32 percent of the dealers said they did not normally adjust the amount of interest due, nor did they adjust the interest for small loans when the loan was repaid prior to the date due. PCA's and FHA's charged interest only for the time that funds were outstanding.



Fertilizer dealers and commercial bankers apparently are influenced in making decisions regarding credit by past experience just as was the case with farmers. Dealers and bankers were asked to state the factors they considered most important in extending credit to farmers with (a) a good credit rating, and (b) a poor credit rating. Past experience in extending credit to the borrowers with good credit ratings was considered most important by both fertilizer dealers and commercial bankers. Character of the borrower was second in importance. For farmers with a poor credit rating, the emphasis was on collateral by both fertilizer dealers and bankers (as shown in Table 26.4).

Table 26.4. Relative Importance of Factors Considered by Fertilizer Dealers and Commercial Bankers in Extending Credit to Farmers With a Good Credit Rating and to Those With a Poor Credit Rating, Alabama, 1958

Factor	Percentage considering factor most important	
	Fertilizer dealers <sup>a</sup>	Commercial bankers <sup>b</sup>
	(percent)	
Farmers with good credit rating:		
Past experience with borrower	68	46
Character	25	36
Collateral	0	9
Income	7	6
Other or not reported	7	3
Farmers with poor credit rating:		
Past experience with borrower	32	12
Character	14	12
Collateral	43	36
Income	0	15
Do not lend to these farmers	0	24
Other or not reported	11	3

<sup>a</sup> Two fertilizer dealers reported two factors each for farmers with good credit ratings.

<sup>b</sup> One banker reported two factors for farmers with a poor credit rating.

# Discussion

## HAROLD G. WALKUP\*

Chapter 26 is a research report in which Yeager recognizes the larger role that agricultural credit plays in the farm business and in the welfare of farmers. He indicates that through the institutions of credit farmers are permitted the flexibility of operation which is required to meet the shifting needs to support changing enterprises.

On the other hand, it is discouraging that farmers in Alabama appear to be narrowly oriented when they seek alternative sources of credit. One cannot help feeling that the reported bargaining mechanism for farm credit could be improved. Although the average interest rates paid were generally within the limits of what might be termed "good commercial practice," the range in rates paid indicate either discriminatory practices or recognition of the value-space implications presented in Chapter 24.

Security requirements for loans, such as chattel mortgages, real estate mortgages, and crop notes, emphasize the need for the farmer to maintain, insofar as possible, a flexibility in his employment of resources which is consistent with the revolutionary developments in agriculture. An outlook toward the future, together with a sizable net worth relative to the financial magnitude of his operation and plenty of know-how, are comforting ingredients in any farming operation. Yet, low net worth apparently coincides with greater need for credit. Thus, the need for credit on reasonable terms in order to arrive at this improved financial status is apparent. Certain impediments, such as landlord-tenant relationships, preclude this ready access to lower-cost credit and thereby impede its efficient use in capital formation. In addition, farmers' lack of knowledge of the best buys of particular factors, or their best employment, also reduces income receipts and, thereby, capital formation.

In the discussion of Chapter 24 it was suggested that the use of factors of production with high marginal productivity and a short-term capital outlay might facilitate improvements in farmer use of credit. Fertilizer was mentioned as being such a factor. I still feel this is a promising course to follow, although Yeager's findings on the farmer basis for using specific fertilizers mean that we would be starting rather low on the knowledge scale. This would be particularly true among the low-income farmers where the need to instill the pecuniary motive is great.

A high percentage of farmers seek the dealer's advice on proper fertilizer use. Unfortunately, many dealers do not have an adequate understanding of fertilizer use to give proper recommendations. In many

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low-income areas of the Southeast we have dealers, as well as other credit sources, recommending to farmers that they use this or that crop-maker instead of so much nitrogen, phosphorus, potassium, and needed minor elements based on a soil test. Since 30 percent of the fertilizer is sold on credit in Alabama, the importance of good fertilizer credit and proper fertilizer recommendations and use are important ingredients in the health of agriculture. Fertilizer dealers who are the principal source of advice to farmers on fertilizer use and also are a primary source of credit to farmers are in a strong position to influence farmers toward a general improvement in credit use on farms. Thus, it appears that bankers and others who are primary sources of agricultural credit could make a valuable contribution to improved resource use in agriculture by working more closely with fertilizer dealers and others who provide resources to agriculture having a short-term investment period.

If agricultural credit agencies are to do a good job of merchandising their product, efforts will need to be directed toward the removal of prevailing attitudes among some farmers and farm owners that borrowing is "poor business." The prevalence of such an attitude probably means that farmers are not taking advantage of their opportunities and that credit agencies are missing some good business. An agricultural representative in a bank or other credit agency who has an intimate knowledge of farming in his trade area and who is interested in the farmer's production problems — as well as his collateral — may do much to allay the farmer's fear of using credit.



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## *Needed Research on Capital and Credit*

**T**HIS CHAPTER is concerned with possible further studies in capital and credit, and priorities for undertaking them. In addition to making some specific research suggestions, a classificatory scheme is presented to aid in organizing the research ideas expressed in earlier chapters.

The first topic considered is one of criteria for selecting research activities. Definitive operational criteria are not available, but the classificatory scheme presented here attempts to relate studies to ultimate purpose. This provides a framework used in the remainder of the chapter. In the second part of the chapter, some specific suggestions for research are made within the confines of a usual definition of farm capital (material resources used in the farming operation). Thirdly, under a broader definition of capital including human resources, the study of the relation of low-income problems to capital formation and credit is considered.

### A CLASSIFICATORY SCHEME

The column headings in Table 27.1 provide a way of classifying studies. Cases that do not fall into any one classification can be placed under a given heading according to their major emphasis. The first column heading, description, refers to data-gathering and presentation. Using a medical analogy, this step corresponds to recording the patient's temperature. The second heading, research in life processes, concerns understanding the behavior of the phenomenon in question. For example, it includes estimation of the influence of variables on the demand for and supply of credit and other studies on how the credit markets function. Under the next heading, diagnosis, fall many of the contributions in this volume. The diagnosis about the capital markets given by some has been "adequate," while by others it has been "imperfect."

Prognosis draws on the preceding three steps. As an example, it was pointed out by Heady in Chapter 7 that the enlarging bundle of resources farm operators use will lead to growth in the demand for credit over future years. Specific predictions about this demand can help private and public credit institutions prepare for the future. Another

Table 27.1. Classification of Studies in Agricultural Finance

Item	Description	Research in life processes	Diagnosis	Prognosis	Prescription	
					Already under debate	Suggested by the research
Agricultural credit	29 (3p)	14 (2p)	10 (3p)	1	0 (1p)	0 (1p)
Farm taxation, local government and public finance	19 (1p)	9 (2p)	3 (2p)	0	0 (4p)	0 (2p)
Farm real estate value	8	8 (4p)	0	0	0	0
Farm financial management	6	4	4	0	0	0 (1p)
Agricultural risk and insurance	7	5 (1p)	3 (1p)	0	0 (1p)	0

example is Baughman and Wetmore's analysis of the probable future supply conditions for credit in agriculture if tight money continues (Chapter 12). Prescription is another important follow-up of the diagnosis. Research can throw light on effects of (1) measures already being debated, and it can bring out for consideration (2) new measures suggested by the diagnosis. Examples of the latter occur in the Back-Hurt (Chapter 20) and Coutu-Lindsey (Chapter 21) contributions. These chapters outline possible policy measures that stemmed from the authors' analyses of low-income farming.

So far only the column headings in Table 27.1 have been discussed. The headings provide a framework for the discussion of needs in the remainder of this chapter.

The rows in Table 27.1 help to portray the present state of research. The numbers were compiled from a summary of in-progress research projects in agricultural finance at the land-grant colleges and U. S. Department of Agriculture.<sup>1</sup> Each project was classified under one of the column headings by judgment on the basis of the project description. A project that did not fall exclusively under one heading was classified according to primary emphasis, and a "p" was recorded under any other relevant heading. Thus the p's refer to numbers of projects partly concerned with the heading but with primary emphasis elsewhere.

## FIVE SUGGESTED PROJECTS

Although the weighting in Table 27.1 is already toward description, a first suggestion is for another project under this heading.

<sup>1</sup> USDA, Agr. Fin. Rev., Vol. 21, GPO, Washington, D. C., July, 1959, pp. 96-117.

### Typical Balance Sheets

An advantage of a balance sheet approach is that it reveals the total capital and liability situation instead of concentrating on only one asset or only one credit instrument. A start toward this type of information is provided by the Balance Sheet of Agriculture for the United States.<sup>2</sup> For analytical purposes, disaggregation is needed not to regions alone but to typical situations. This is particularly important for keeping track of the financial condition of farmers, because favorable and unfavorable situations in an aggregate balance sheet can offset one another.

The breakdown used in gathering USDA farm costs and returns data is a starting point for arriving at relatively homogeneous farming situations.<sup>3</sup> For each, a three-way age classification might be sufficient: young, middle-aged, and elderly operators. If age is sufficiently correlated with tenure position and with other characteristics that influence the asset-liability structure, no further breakdowns might be needed.

Costs of acquiring this basic information appear small viewed against the large number of descriptive projects receiving support. This is one area where agriculture does not match other sectors in the mass of information available, due to the published financial data on large corporations. The information would be useful to makers of agricultural policy, to public and private banking institutions, and to those who sell to farmers.

### Projecting Ahead Under Alternative Conditions

Perhaps the most glaring lack in Table 27.1 is under the prognosis heading. Therefore, a next suggestion is to use the foregoing information in "near- and far-term outlook" work.

Rather than concentrating on outright prediction, projectionists might consider alternative contingencies. Assumptions as to changes in type of farming and technology may largely determine the asset side. This aspect of prediction may be easier since it depends on things we are used to in trying to predict. The structure of liabilities will depend in part on (1) the relative importance of different credit institutions, and (2) how general credit conditions affect the supply of credit. Income and savings of farmers between the present and the period of projections will influence the balance sheet. Savings need to be projected and appropriate assumptions made about the extent to which savings will be used in building up assets or in reducing liabilities.

While the suggested projection would be aided by further research under the heading of life processes, its initiation does not have to wait on that kind of research. It could be made a part of the present outlook work. Longer term projections would make possible a less foggy picture

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<sup>2</sup> USDA, Balance Sheet of Agriculture 1959, Agr. Info. Bul. No. 214, GPO, Washington, D.C., 1959.

<sup>3</sup> Farm Costs and Returns, Commercial Family-Operated Farms by Type and Location, ARS, USDA, Agr. Info. Bul. No. 176, GPO, Washington, D.C., 1959.



of the future environment of farming that would aid in anticipating financial problems as well as many other policy problems.

### Credit Adequacy

A definition of the word "adequacy," in relation to credit, might be "use of all the credit that can be productively borrowed on terms that reflect the alternative uses of the credit." If accepted, this definition gives a criterion for doing survey research under the diagnosis heading.

Random sampling is one of the most important attributes of the suggested surveys. This step is necessary to find both those farmers who are being served by financial institutions and those who are not. The following four-way frequency table would be filled in for a given farming area:

NEED CREDIT		DON'T NEED CREDIT	
WANT	DON'T WANT	WANT	DON'T WANT

If we knew what proportion of cases falls in each cell and something of the characteristics of farms concentrated in the cells, a more objective appraisal of adequacy would be possible. The indication is that credit is adequate when farmers neither need nor want credit. Significant inadequacies would be indicated by a large number of farmers in the "Need Credit" category. If a farmer in this group wants credit, external capital rationing is suggested. If he does not want it, internal rationing is suggested.

A crucial question is how the state of need is to be estimated. The experience of persons actually in the lending business might be drawn upon in answering this question. Need would be judged by using these persons' lending standards, and the standards would be altered only when it was clear that they did not result in "good judgment" of loan productivity. Alternatively, objective lending criteria might be devised by the researcher — a problem being to achieve standards that are really more reliable than those of experienced lenders. Since ideas about need may depend on the conditions under which credit is available, these conditions should at least be kept explicit and perhaps varied to see how they affect results.

### Asset Formation

The next suggestion falls under the heading of research in life processes. It has to do with the acquisition and transfer of wealth. If research funds were very limited, even a few case studies would be instructive.

Major sources of wealth for an individual are: savings, inheritance, and capital gain (cf. Chapter 2). These sources would be traced through time. For example, in tracing the effects of the federal tobacco program, it has been estimated that this program imparts a sale value to land with tobacco allotments perhaps ten times the value of equivalent land without allotment.<sup>4</sup> For a typical multiple unit operation with 15 acres of tobacco in the coastal plain of North Carolina, the allotment value might be \$37,500, an amount more than half the total asset value of the farm business. The recipient of this gain was the person who owned the land during the rise in value. Some of these people are still alive and own the land. Others have died, and the gain has gone to their heirs. Some heirs have scattered throughout the nation. Others are still on the farm, but their financial position may have been affected by the necessity of buying out their co-heirs.

The same idea cited in the example of the tobacco program applies to other causes of change in wealth, e.g., rising general land values or ups and downs in farm income. These studies would aid in making the projections recommended earlier. They would make it possible to better anticipate and aid credit adjustments.

The studies should aim at more than a cross-section analysis. The 25-year-old farmer of today cannot reliably be predicted to have a financial position fifteen years from now like that of the 40-year-old farmer of today. Witness the error if the prediction had been made fifteen years ago. This type of prediction would presuppose no change in technology, credit conditions, and factor and product prices. A better clue to the future may be to find out how — through time — farmers have acquired wealth, and then to consider the probable continuance of wealth acquisition relative to future trends in asset requirements for farming.

### Effects of Federal Reserve Board Decisions on Farming

The president of a southern country bank has stated that, in contrast to the late 1950's, applications for farm loans are being turned down automatically in the 1960's if they fall in the bottom third in terms of quality. Here is evidence that tight money has had an effect on borrowing. Have farmers turned primarily to kinds of credit other than bank credit? Or have they foregone real farm investments? This is research in the life process that is needed in evaluating national monetary policies.

<sup>4</sup> F. H. Maier, J. L. Hedrick, and W. L. Gibson, *The Sale Value of Flue-Cured Tobacco Allotments*, Va. Agr. Exp. Sta. Tech. Bul. No. 148, Blacksburg, 1960.



## BROADER DEFINITION OF CAPITAL

So far, this chapter has dealt with the usual farm business definition of capital. Brinegar's contribution to this volume (Chapter 3) gives a comprehensive list of the additional kinds of capital committed to agriculture. For instance, additional physical capital includes such things as roads and capital used by firms that produce inputs purchased by agriculture.

Enlarging the scope further to encompass human capital enables us to discuss the relation of credit to low-productivity or low-income problems. These problems are related to credit partly, of course, because in the course of their solution credit of the traditional kind may be involved. More importantly, however, their solution will involve changing the quality of human capital.

## Three Kinds of Low Productivity Farming

Consider first the situation often thought of in connection with "hill" people. Farming techniques are old-fashioned and show little tendency to change. Living levels and way of life tend to stay static while the rest of the world progresses. The phenomenon can sometimes persist remarkably close to cities. There is no ignorance of alternatives, as some of the farmers have at one time had high-paying urban employment in many different sections of the country. They have returned to their original locale and way of life out of preference. A majority of these persons have relatives in high-paying urban employment.

Rather than lack of knowledge of alternative job opportunities, impediments to change for these people may center in community-wide attitudes. They are caught in a total situation that includes lack of desire to change, lack of acquired skills, and lack of confidence in their ability to change.

At least one capital problem and two credit problems are related to ameliorating this situation. The capital problem has to do with human capital formation, viz., education, which helps both by increasing people's ability through developing their latent powers and through influencing outlook and attitudes (cf. Chapters 22 and 23). Both skeptics and those who are more idealistic about possibilities for advancement through education can cling to their beliefs because the concrete effects of education are often difficult to trace even though they may be of utmost importance. If education is in fact a major long-run solution for the kind of low-income farming situation discussed herein, the prospects for success are not clear. As often stated, there are impediments to optimal investments in the human agent that are particularly felt in the southern states where low productivity farming is concentrated. The vicious cycle of low per capita income providing a small local tax base and preventing higher education expenditures that would raise per capita income is aggravated by the high out-migration rates from the Southeast



(cf. Chapter 4). High birth rates coupled with out-migration mean that compared to other regions each earner is contributing to the education of a disproportionately large number of children.

Another approach more direct than general education is that of imparting technical assistance to low productivity farmers. A credit problem then arises because credit may be complementary with technical assistance. Most experts seem to agree that credit alone is not sufficient to solve typical low productivity problems. But as farmers acquire more ability, they are likely to become able to control profitably a larger bundle of resources. Credit will be needed to acquire these resources. Generally, these persons have not been in the credit market before, and due to their inexperience they may appear to be high-risk borrowers; therefore, private lending institutions may be understandably reluctant to supply credit to them.

Another and less important credit problem may be associated with the aftermath of doing away with low productivity situations. This is the problem of adjustment of private lending institutions to a new type of farming that will emerge when low-income operations cease. Of course, in some instances there may be no problem because the final agricultural adjustment may involve areas going out of production altogether. In other instances where there is now subsistence cropping, the final adjustment may involve, for example, large dairy farms. As suggested in the first part of this chapter, balance sheets need to be projected ahead for areas in order to anticipate future demands for credit. This is especially true in dynamic situations such as would be encountered by successful solution of low-income problems.

Consider now a second form of low productivity farming not so widespread as the first. The farmers are middle-aged or older, and they reflect a community situation which is in the process of taking care of itself. There may be nearby industrialization that is attracting younger entrants into the labor force so that they do not remain in a low-income farm situation. Or a new type of farming may be adopted that will gradually displace the low-income farmers as they grow old and retire. Though their land may be much in demand, they will cling to their way of life because they are not inclined to start a new life at an advanced age. Since this situation is happily resolving itself with time, it does not appear to have the same order of urgency as the first type of low productivity situation described.

A third type of low-income farming is quite different from the first two. It involves share-croppers and operators of small single units. Unlike the first two situations which involve predominantly subsistence farming, the agriculture in this third type of situation is based on high-value crops such as cotton, tobacco, peanuts, and even cash grains. Incomes of the croppers and many single unit operators are low because these persons contribute little except their labor power to the productive process. In contrast to the first two situations, farming methods are up-to-date. Fertilization levels are as high as scientific recommendations, latest plant varieties are used, and tractors are a prevalent source

of power. These farming advances are due in part to high-level management of the multiple units on which the share-croppers operate. Enough single-unit operators may be progressive in adopting new techniques so that these can be copied on a wide scale by less innovative farmers.

Two paths out of this type of low productivity situation may be distinguished. Both paths could be followed simultaneously.

Keeping the quality of human input constant, incomes might rise through an increase in remuneration to the labor factor in these areas — a process already taking place to some extent. Due to population pressures, the migration valve to northern cities is already open, and it acts to lift southern farm wage rates. Incomes are still low, relatively, but they have risen over the years along with the rising real wage in the nation as a whole. Local industrialization in an area also serves to affect remuneration of labor in agriculture. While it is difficult to generalize about the consequences resulting from rising agricultural labor returns in an area, two major possibilities are (1) that such a rise will force land rents down, supposing land to be the residual claimant whose residuum is now reduced due to higher labor costs, and (2) that it will hasten substitution of machinery and other inputs for labor. In some cases the area may be forced out of agricultural production entirely if revenue available for land rent becomes negative due to high labor costs. This is most likely to happen where competition from outside regions — as with cotton — is already operative.

The other path to higher income for this third situation involves changing the quality of the human input. Investments would be made in the human agent so that low-income people could receive a return on their decision-making abilities as well as on their physical labor input. This path might force the demand for land in an area upward, as the supply of farm operators wishing to farm could be expected to increase. Return to existing management might be decreased. The management return for older operators is of the nature of quasi-rent associated with ability to manage, which was acquired partly through experience. A decrease in returns to management would be expected due to a larger total supply of management for the area.

The above discussion suggests that investment in human agents in these situations might take the form of increased expenditures for general public education, with technical assistance possibly de-emphasized. Technical assistance pointed directly at farm decisions would increase the supply of management characteristics with which these areas are already well endowed.<sup>5</sup>

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<sup>5</sup> For other distinctions between low-income types, see C. E. Bishop, "Effects of alternative public policies on the small farm problem," *Increasing Understanding of Public Problems and Policies*, 1956, pp. 73-79; and W. E. Hendrix, "What to do about low income in agriculture," *Jour. Farm Econ.*, Vol. 38, No. 5, Dec., 1956, pp. 1385-97.



## Research

The three types of low productivity situations discussed call for different research emphases, though they have common elements. The first (hill-people type) suggests research concerned with (1) attitudes, (2) investment in human input via general education, and (3) technical assistance. Attitudes may include aversion to borrowing. However, a hypothesis is that this is only part of a Weltanschauung that needs to be changed more fundamentally than to try to operate on only-symptomatic beliefs. Once an outlook that includes determination to progress to higher levels of living is imparted, the negative attitude toward credit is among the many attitudes that will then change. However, problems reflected in attitude changes will not be considered here (see Chapters 20 and 21). As indicated above, (2) and (3) of the suggested research have a closer relation to capital and credit.

The second (disappearing) type of low-income farming was not found to be of the same order of urgency as the other types. Therefore, the second type is not given special attention here.

For the third (cash cropping) type, it was mentioned that whatever the specific nature of solution of low-income problems in these areas, success in raising incomes would entail substantial changes in labor supply for these areas leading to complex farming adjustments. Credit requirements change with any substantial agricultural adjustment. Possibilities for research meeting these needs were discussed in the first part of this chapter. For the third low-income type, education represents the main effort related to capital and credit.

With the similarities and differences between the three types of low-income situations in mind, we may now enumerate several areas of research that appear promising in the areas of (a) capital formation and (b) credit in relation to low-income farming.

Public education. The first of four possibilities for more research on education is to undertake more semi-descriptive studies of school finance in low-income farming areas. In addition to a detailed account of how expenditures and sources of revenue differ among parts of the nation, an attempt could be made to determine how proposed measures for federal aid to education—as well as other possible changes in school finance—would aid low-income farmers. The research would provide a running check on progress in raising educational standards for people in these areas.

A second area of research could center on attempts to measure costs and returns from education. Several measurements at the national level have been attempted, and costs and returns from certain types of professional education have been estimated. The results suggest that it is possible to get some notion of the economic return from educational investment. Costs include expenditures necessary to impart education plus any foregone earnings of students during their time of education. Returns include earnings of students over and above what they would have been in the absence of education. That this approach is practicable



has been shown in previous research. Data should now be used for specifying, on purely economic grounds, the case for additional public education expenditures in states and areas where per pupil expenditures on education are low relative to the rest of the nation (cf. Chapters 4 and 22). Suppose the capacity for education of people in the South, and in New York and other states with high education expenditures, were the same — an expected phenomenon if for no other reason than the large migration to the latter areas. Under such conditions there would be *prima facie* evidence that either New York is heavily overinvesting in education or the South is heavily underinvesting. This proposition needs to be tested.

A third area relates to the quality and content of the educational investment. The agricultural economist may not be uniquely qualified to study this aspect of education. However, he could, in cooperation with education specialists and others, undertake studies of the extent to which education in low-income rural areas is preparing these persons for the future. Insight might then be gained as to how to improve the educational programs.

A fourth possibility for research on education would be the study of ways to increase private loans for professional and technical education. What is the extent of this practice at the present time? How consistent is it with existing standards of lenders? Does it offer promise of being a significant source of increased educational expenditures?

Credit and technical assistance for farmers emerging from low-income status. Further study could be made of capital requirements and ability to use capital as farmer management levels improve. Several studies have been completed.<sup>6</sup> Linear programming can be conducted, with production coefficients introduced as variables, to determine how capital requirements vary with managerial ability. Conjectures could then be made as to how capital requirements will grow over time as farmers emerge from low-income situations. Experimentation in actually granting credit and technical assistance to selected farmers has been started by the North Carolina Rural Rehabilitation Corporation. Continued experiments of this nature seem desirable.

Credit institutions in relation to economic development. A problem is how to arrange a role for public agencies different from that of private banks and other private lending institutions. There is little point in having public institutions which are simply and solely competitors of private institutions. The discussion in previous parts of this chapter suggests that there may be a unique role for credit institutions that private institutions cannot be expected to fulfill. The public institutions,

<sup>6</sup> C. E. Bishop, "Part-time farming and the low income farm problem," *Jour. Farm Econ.*, Vol. 37, No. 5, Dec., 1955, pp. 1428-35; Quentin W. Lindsey, *Transforming Low-Income Farms into Profitable Commercial Farms*, A. E. Info. Series No. 76, North Carolina State College, Raleigh, May, 1960; Quentin W. Lindsey, *Financing the Development of Commercial Farms*, A. E. Info. Series No. 77, North Carolina State College, Raleigh, June, 1960; Lee R. Martin, Arthur J. Coutu, and H. S. Singh, "The effects of different levels of management and capital on the incomes of small farmers in the South," *Jour. Farm Econ.*, Vol. 42, No. 1, Feb., 1960, pp. 90-102.

for instance, might be geared to provide joint technical assistance and credit. The previous discussion also suggests a role for public institutions in providing credit for farmers emerging from a low-income status who, due to lack of experience, appear as high-risk borrowers to private lenders.

Periodic rethinking of alternative institutional arrangements for providing credit should be undertaken. This might be carried out in conjunction with case studies of the experiences in lending of some of the public credit agencies.





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